IEI Technology Corp.



MODEL:

PCIE-Q350

Intel® Q35 Northbridge PICMG 1.3 CPU Card supports Intel® LGA775 Core™2 Quad/Core™2 Duo/Celeron CPU 8GB DDR2, Six 3.0 Gbps SATA, Twelve USB 2.0 One PCIe x16, Four PCIe x4, Four PCI and Dual PCIe GbE

User Manual

RoHS Lead Free

Rev. 1.00 AUGUST 2007

Revision

Date	Version	Changes
2007-08-30	1.00	Initial release

Manual Conventions

WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the PCIE-Q350 or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the PCIE-Q350. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the PCIE-Q350. Please take caution messages seriously.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word "note" is written as "**NOTE**," both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the PCIE-Q350. Please take note messages seriously.

Copyright

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PCIE-Q350 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the PCIE-Q350 package.

- 1 x PCIE-Q350 single board computer
- 1 x PS/2 Keyboard and mouse Y-cable
- 1 x Keyboard and mouse cable with Mini DIN
- 2 x SATA power cables
- 4 x SATA cables
- 1 x Dual RS-232 cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

Table of Contents

List of Figures

List of Tables

BIOS Menus

Glossary

AC '97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	Compact Flash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel® SpeedStep Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

Chapter

1

Introduction

1.1 Overview

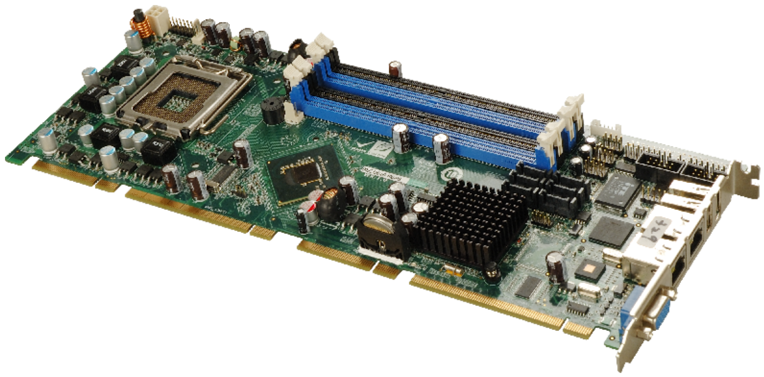


Figure 1-1: PCIE-Q350 PICMG 1.3 CPU Card

The PCIE-Q350 PICMG 1.3 form factor CPU card (**Figure 1-1**) is an LGA775 Intel® Core™2 Quad, Intel® Core™2 Duo or Intel® Celeron CPU processor platform. Both 45nm core (Wolfdale, Yorkfield) and 65nm core (Conroe) processors are supported. (For a full list of supported processors please refer to **Section 2.3**)

Up to four 2.0 GB 667 MHz or 800 MHz un-buffered DDR2 SDRAM DIMM are supported by the Mobile Intel® Q35 graphics memory controller hub (GMCH). The Intel® Q35 GMCH also has a single PCI Express x16 (PCIe x16) expansion lane for a PCIe x16 graphics card on the backplane.

The integrated Intel® ICH9DO I/O controller hub (ICH) supports six SATA II drives with data transfer speeds of 3.0 Gbps with SATA RAID configuration support. Twelve USB 2.0 channels, four expansion PCIe x1 channels and four expansion PCI channels provide flexible expansion options. Support for a (optional) trusted platform module (TPM) provides additional system security during system boot-up. High Definition Audio (HDA) support ensures an HDA audio kit can be easily implemented on the PCIE-Q350.

1.1.1 PCIE-Q350 Expansion Options

The PCIE-Q350 PICMG 1.3 form CPU card has the following backplane expansion options:

- 1 x PCIe x16 graphics card
- 4 x PCIe x1 expansion cards
- 4 x PCI expansion cards

1.1.2 PCIE-Q350 Features

Some of the PCIE-Q350 features are listed below.

- Supports the following Intel® LGA775 processors:
  - Intel® Core™2 Duo (45nm and 65nm)
  - Intel® Core™2 Quad (45nm and 65nm)
  - Intel® Celeron (65nm)
- Supports four 240-pin 2GB 667MHz or 800 MHz DDR2 DIMMs
- Six SATA II drives with transfer rates of 3.0 Gbps supported
- Twelve USB 2.0 devices supported (eight onboard and four on the backplane)
- Dual GbE Ethernet connectors
- PICMG 1.3 form factor
- RoHS compliant
- Supports ATX power supplies

1.2 PCIE-Q350 Overview

1.2.1 PCIE-Q350 Overview Photo

The PCIE-Q350 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the PCIE-Q350.

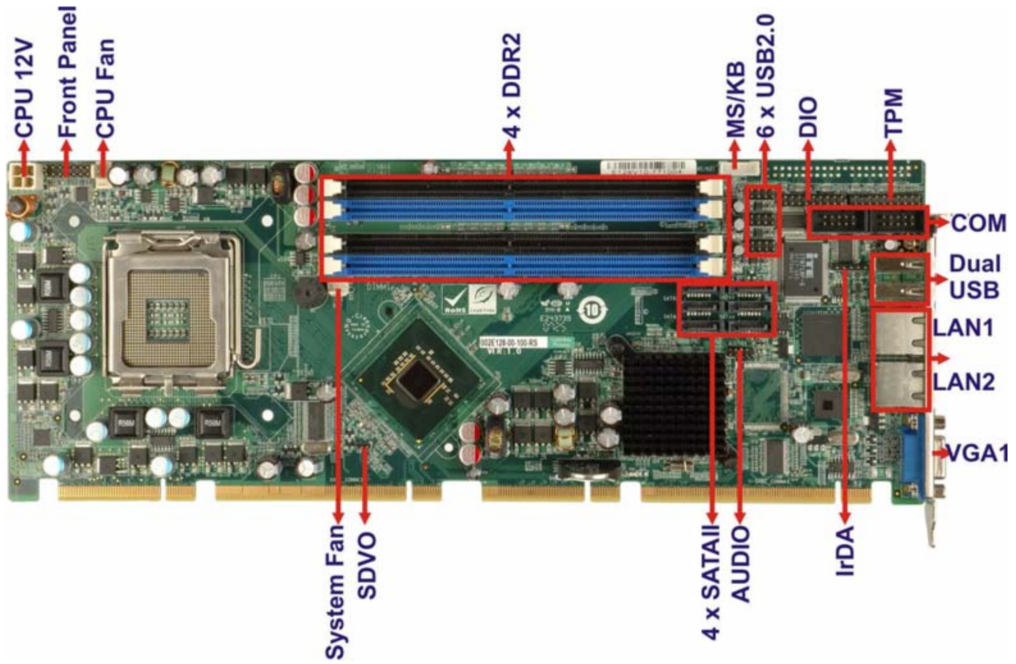


Figure 1-2: PCIE-Q350 Overview [Front View]

1.2.2 PCIE-Q350 Peripheral Connectors and Jumpers

The PCIE-Q350 has the following connectors on-board:

- 1 x ATX power connector
- 1 x Audio connector
- 1 x Digital input/output (DIO) connector
- 2 x Fan connectors
- 1 x Front panel connector
- 1 x Infrared interface connector
- 1 x Keyboard/mouse connector
- 6 x Serial ATA II (SATA II) drive connectors
- 2 x Serial port connectors
- 1 x TPM connector
- 1 x SDVO control connector
- 3 x USB 2.0 connectors

The PCIE-Q350 has the following external peripheral interface connectors on the board rear panel.

- 2 x RJ-45 Ethernet connectors
- 2 x USB 2.0 connectors
- 1 x VGA connector

The PCIE-Q350 has the following on-board jumpers:

- Clear CMOS

1.2.3 Technical Specifications

PCIE-Q350 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	**PCIE-Q350**
Form Factor	PICMG 1.3
System CPU	LGA775 Intel® Core™2 Quad LGA775 Intel® Core™2 Duo LGA775 Intel® Celeron
Front Side Bus (FSB)	800 MHz, 1066 MHz or 1333 MHz
System Chipset	**Northbridge**: Intel® Q35 Express Chipset **Southbridge**: Intel® ICH9DO
Memory	Four 240-pin DDR2 DIMM sockets support four single-channel or dual-channel 2.0 GB 667 MHz or 800 MHz DDR2 DIMMs
Super I/O	ITE IT8718F Rev. G
Display	Analog VGA display through external DB-15 connector
BIOS	AMI BIOS label SPI EEPROM 8.0 MB

Audio	10-pin header 7.1 channel HD audio kit with RealTek ALC883 codec and dual audio streams supported
LAN	One Intel® 82566DM (PHY) and Intel® ICH9DO (MAC) One PCIe x1 Intel® 82573L (MAC and PHY)
COM	Two RS-232 serial ports through onboard pin-headers
USB2.0	Twelve USB 2.0 devices supported: ■ Six by onboard pin-headers ■ Two by external connectors ■ Four through the backplane
SATA	Six 3.0Gb/s SATA II drives supported
SATA RAID Levels	RAID 0, RAID 1, RAID 5 and RAID 10
Keyboard/mouse	By pin-header through the ITE IT8718F super I/O
Digital I/O	One16-bit digital input/output connector; 8-bit input/8-bit output through the ITE IT8718F super I/O
Watchdog Timer	Software programmable 1-255 sec. through the ITE IT8718F super I/O
Infrared	One IrDA connector through the ITE IT8718F super I/O. Supports: ■ Serial Infrared (SIR) ■ Amplitude Shift Keyed IR (ASKIR)
Power Supply	**Onboard:** 4-pin 12V ATX power connector **Backplane:** 24-pin ATX power on PICMG 1.3 backplane
TPM	Supports TPM v1.2 with 20-pin onboard pin-header
Fan Connector	Three pin system fan pin-header Four pin CPU fan pin-header
Buzzer	Yes

Power Consumption	3.3V@3A, 5V@5.1A, +12V@4.23A and 5VSB@0.28A (2.66 GHz E6700 Intel® Core™2 Duo CPU with a 1066MHz FSB and four 2.0 GB, 667 MHz DDR2 DIMM running 2Dmark® 2001 SE 330)
Temperature	0ºC – 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	338.58mm x 126.39mm
Weight (GW)	1.1Kg

Table 1-1: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 338.58mm
- **Width**: 126.39mm

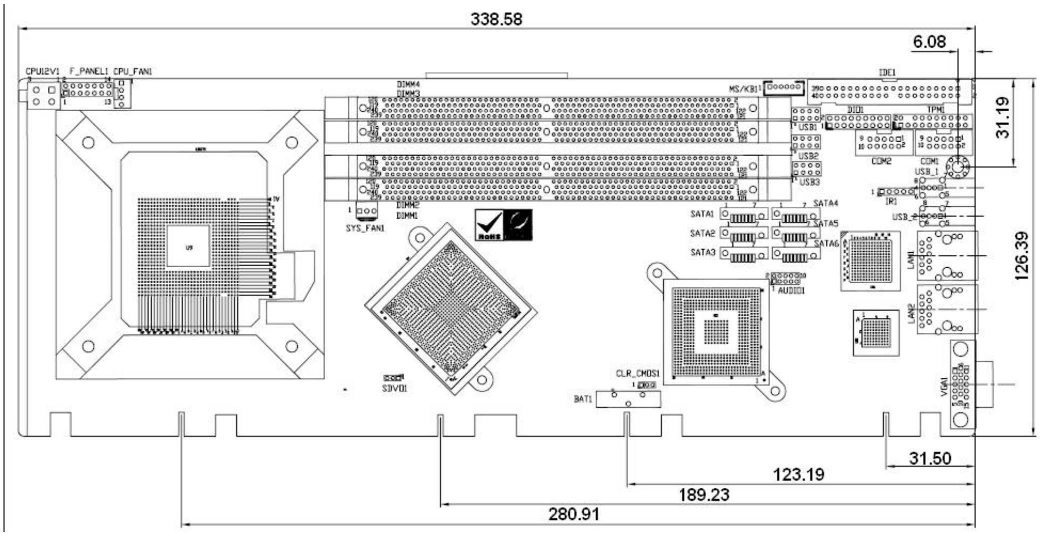


Figure 2-1: PCIE-Q350 Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

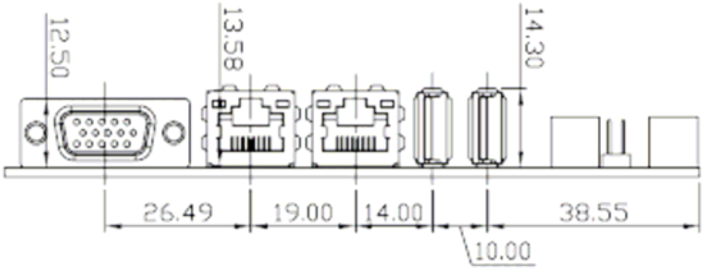


Figure 2-2: External Interface Panel Dimensions (mm)

2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

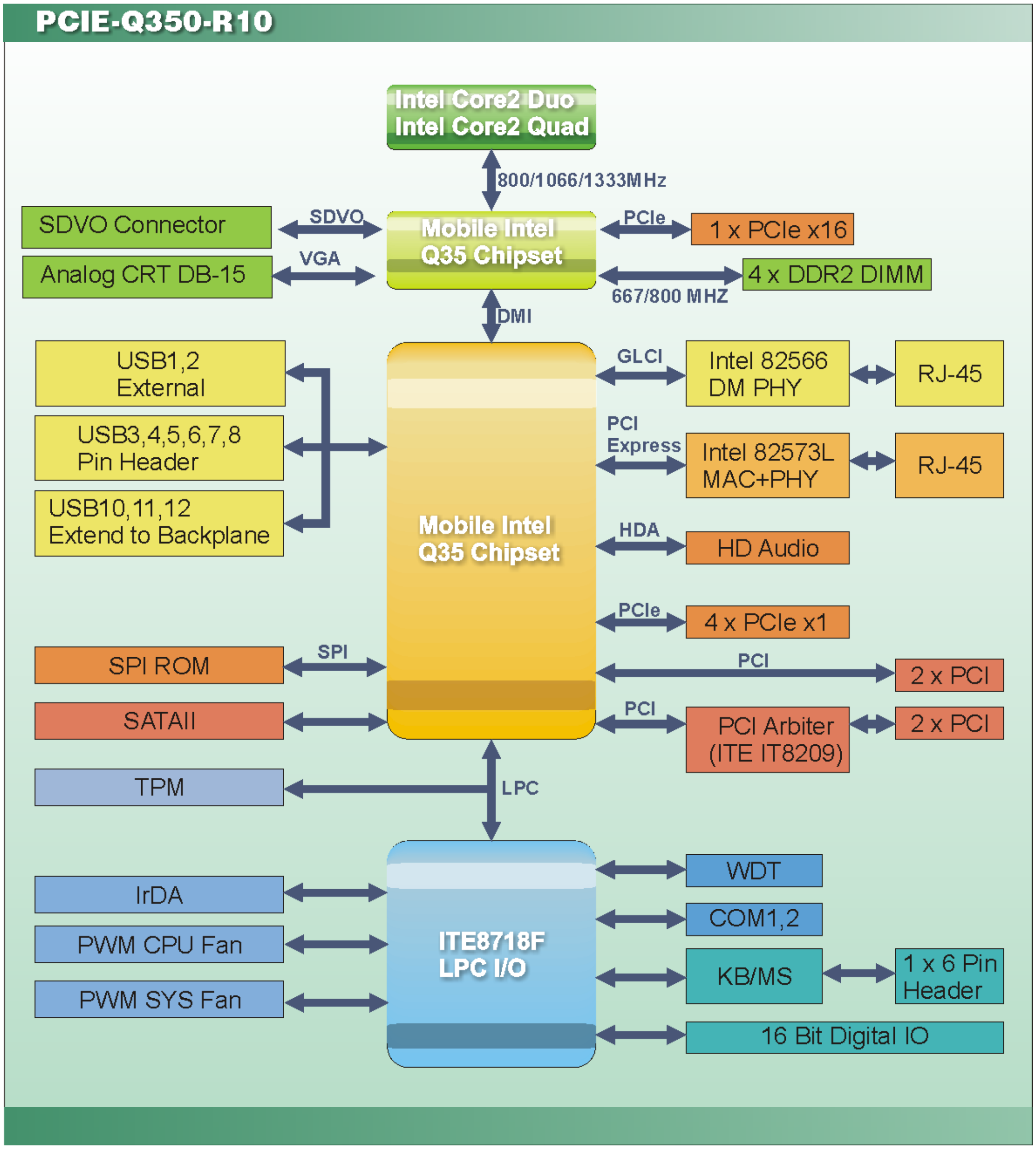


Figure 2-3: Data Flow Block Diagram

2.3 Compatible Processors

2.3.1 Supported Processors Overview

The PCIE-Q350 supports the following Intel® LGA775 processors

- Intel® Core™2 Quad (Yorkfield)
- Intel® Core™2 Duo (Wolfdale)
- Intel® Core™2 Duo (Conroe-2M)
- Intel® Celeron (Conroe L)

2.3.2 Supported Intel® Core™2 Quad (Yorkfield) Processors

The Yorkfield core Intel® Core™2 Quad CPU is a 45nm LGA775 processor.

NOTE:

As of the date of writing this manual (August, 2007), Intel® has not released Intel® Core™2 Quad (Yorkfield) processor numbers that are supported by the Intel® Northbridge. As soon as processor numbers are released, the manual will be updated.

For further details about supported Intel® Core™2 Quad (Yorkfield) processors, please contact Intel® directly.

2.3.3 Supported Intel® Core™2 Duo (Wolfdale) Processors

The Wolfdale core Intel® Core™2 Duo CPU is a 45nm LGA775 processor.

NOTE:

As of the date of writing this manual (August, 2007), Intel® has not released Wolfdale core Intel® Core™2 Duo processor numbers that are supported by the Intel® Q35 Northbridge. As soon as processor numbers are released, the manual will be updated.

For further details about supported Intel® Core™2 Duo (Yorkfield) processors, please contact Intel® directly.

2.3.4 Supported Intel® Core™2 Duo (Conroe-2M) Processors

Table 2-1 lists the Conroe-2M core Intel® Core™2 Duo processors supported on the PCIE-Q350. All the processors in Table 2-1 are 65nm LGA775 processors with the following features:

- Enhanced Halt State (C1E)
- Enhance Intel® Speedstep® Technology
- Execute Disable Bit
- Intel® EM64T
- Intel® Thermal Monitor 2
- Intel® Virtualization Technology (**Only on E6400**)
- Intel® Dual Core Technology

Processor #	CPU Speed	FSB Speed	Cache Size
E6400	2.13 GHz	1066 MHz	2 MB
E4300	1.80 GHz	800 MHz	2 MB

Table 2-1: Supported Intel® Core™2 Duo (Conroe) Processors

2.3.5 Supported Intel® Celeron (Conroe L) Processors

Table 2-1 lists the Conroe L core Intel® Celeron processors supported on the PCIE-Q350. All the processors in Table 2-1 are 65nm LGA775 processors with the following features:

- Execute Disable Bit

Processor #	CPU Speed	FSB Speed	Cache Size
440	1.86 GHz	533 MHz	1 MB

Table 2-2: Supported Intel® Core™2 Duo (Conroe) Processors

2.4 Intel® Q35 Northbridge Chipset

2.4.1 Intel® Q35 Northbridge Chipset

The Intel® Q35 Northbridge chipset is an advanced Graphics and Memory Controller Hub (GMCH) that supports a range of Intel® processors including 45nm Wolfdale dual core and Yorkfield quad core and 65nm Conroe core processors. The Intel® Q35 Northbridge supports 1333 MHz, 1066 MHz, or 800 MHz FSB and up to 8.0 GB of 667 MHz or 800 MHz DDR2 SDRAM. The Intel® Q35 Northbridge is interfaced to an Intel® ICH9DO Southbridge chipset through a Direct Media Interface (DMI) communications link.

2.4.2 Intel® Q35 Front Side Bus (FSB) Support

The Intel® Q35 Northbridge supports processors with the following FSB speeds:

- 800 MHz
- 1066 MHz

- 1333 MHz

The LGA775 socket, Intel® Q35 Northbridge and the FSB are shown in **Figure 2-4**.

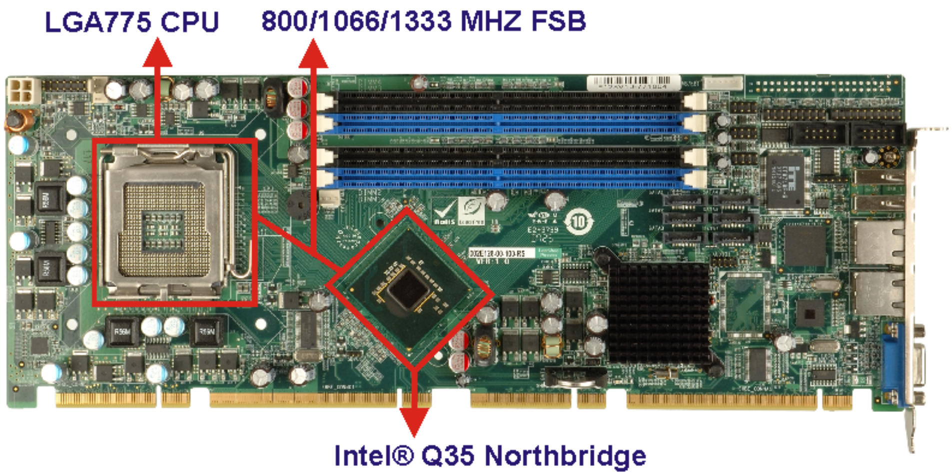


Figure 2-4: Front Side Bus (FSB)

2.4.3 Intel® Q35 Memory Controller

The memory controller on the Intel® Q35 Northbridge can support up to 8.0 GB of DDR2 SDRAM. Four DDR2 SDRAM DIMM sockets on the PCIE-Q350 are interfaced to the Intel® Q35 Northbridge memory controller. The DDR2 sockets are shown in **Figure 2-5.**

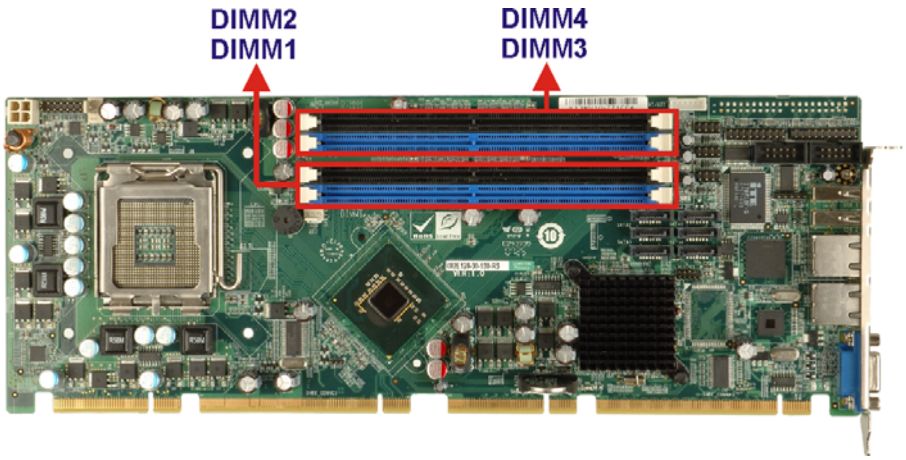


Figure 2-5: DDR2 DIMM Sockets

CAUTION:

If more than one DDR2 DIMM is being installed in the system, please purchase two DIMM that have the same capacity and operating frequency.

Each DIMM socket can support DIMMs with the following specifications:

- DDR2 only
- Un-buffered only
- 667 MHz or 800 MHz
- 2.0 GB maximum capacity per DIMM (8.0 GB supported with four DIMM)
- Memory bandwidth:
  - 6.4 GBps in single-channel or dual-channel asymmetric mode
  - 12.8 GBps in dual-channel interleaved mode assuming DDR2 800MHz

2.4.4 Intel® Q35 PCIe x16 Interface

The Intel® Q35 PCIe bus is compliant with the PCI Express 1.1a Specifications has the following PCIe lanes:

- One PCIe x16 graphics interface
- PCIe frequency of 1.25 GHz (2.5 Gbps in each direction)

For further details on the PCIe interfaces, please refer to **Section 2.6.2** on **page 29**.

2.4.5 Intel® Q35 Graphics and Display Features

NOTE:

The Intel® Q35 Graphics and Display Features can be configured in the Northbridge BIOS configuration screen. Please refer to **Section 6.7.1** on **page 155**.

The Intel® Q35 GMCH integrated graphics device (IGD) has 3D, 2D and video capabilities. The Unified Memory Architecture (UMA) uses up to 256 MB of Dynamic Video Memory Technology (DVMT) for graphics memory. External graphics accelerators on the PCIe graphics (PEG) port are supported but cannot work simultaneously with the IGD.

2.4.6 Intel® Q35 SDVO and Analog Display Features

The Intel® Q35 GMCH provides access to:

- A progressive scan analog monitor
- An SDVO monitor

2.4.6.1 Intel® Q35 SDVO Capabilities

A Serial Digital Video Output (SDVO) communications bus is multiplexed to eight of the sixteen PCIe ports on the Intel® Q35. The SDVO interface provides 1.0 MHz point-to-point connectivity between the Intel® Q35 and an SDVO device. The PCIE-Q350 supports a single SDVO device on a compatible IEI backplane. The SDVO device is installed in the PCIe x16 expansion slot and the SDVO function enabled by connecting a 3-pin SDVO control connector on the PCIE-Q350 to a corresponding control connector on the IEI backplane. The SDVO control connector on the PCIE-Q350 is shown in **Figure 2-6**.



Figure 2-6: SDVO Connector

Some of the capabilities of the Intel® Q35 SDVO port are listed below:

- Multiplexed with the PCIe x16 graphics port signals
- Drives pixel clocks up to 270 MHz
- Supports a single-channel SDVO device.
- Digital display channels can drive a variety of SDVO devices including
  - TMDS
  - TV-Out
- Only works with the IGD
- 3x3 Built In full panel scalar
- 180 degree Hardware screen rotation
- 270 MHz dot clock on each 12-bit interface
- Supports flat panels up to 2048 x 1536 @ 60 Hz or digital CRT/HDTV at 1920 x1080 @ 85 Hz
- Supports Hot-Plug and Display
- Supports TMDS transmitters or TV-out encoders
- ADD2/Media Expansion card that use the PCIe graphics x16 connector

2.4.6.2 Intel® Q35 Analog Display Capabilities

A single external female DB-15 (VGA) connector interfaces an analog display to an analog CRT port on the Intel® Q35 GMCH. The VGA connector is shown in **Figure 2-7**.

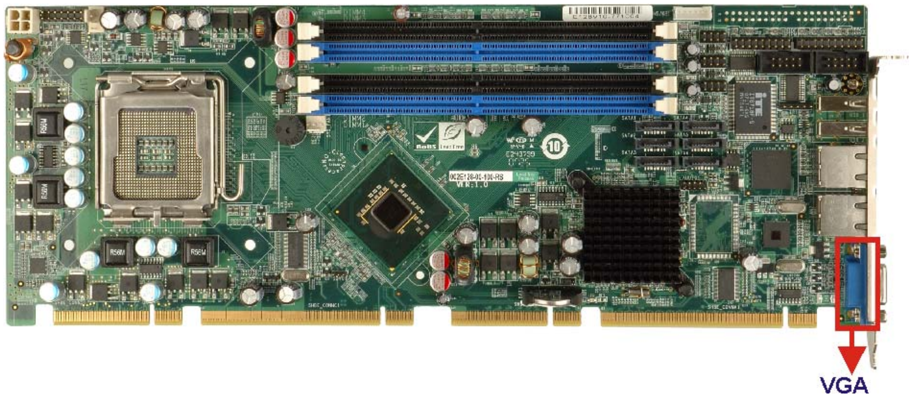


Figure 2-7: VGA Connector

Some of the capabilities of the Intel® Q35 analog CRT port are listed below:

- 400 MHz Integrated 24-bit RAMDAC
- Up to 2048x1536 @ 75 Hz refresh
- Hardware Color Cursor Support
- DDC2B Compliant Interface

2.4.7 Intel® Q35 Direct Media Interface (DMI)

The Direct Media Interface (DMI) is the communication bus between the Intel® Q35 GMCH and the ICH9DO I/O controller hub (ICH). The DMI is a high-speed interface that integrates advanced priority-based servicing and allows for concurrent traffic and true isochronous transfer capabilities. The DMI is shown in **Figure 2-8**.

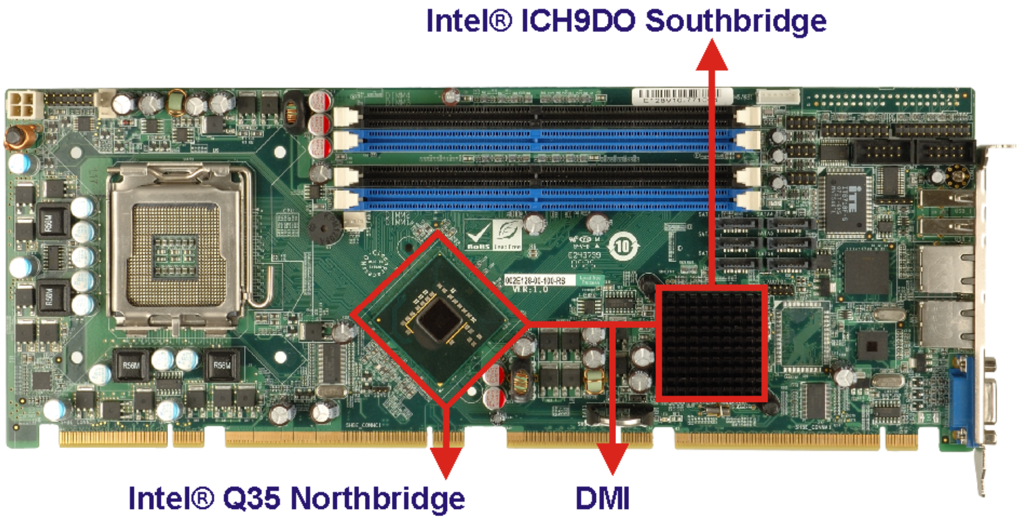


Figure 2-8: DMI Chip-to-Chip Connection

Some of the features of the DMI include:

- 2.0 GBps point-to-point DMI to ICH9DO (1.0 GBps in each direction)
- 100 MHz reference clock (shared with PCI Express* Graphics Attach)
- 32-bit downstream addressing
- APIC and MSI interrupt messaging support
- Message Signaled Interrupt (MSI) messages
- SMI, SCI and SERR error indication

2.5 Intel® ICH9DO Southbridge Chipset

2.5.1 Intel® ICH9DO Overview

Intel® ICH9DO Southbridge is an advanced I/O controller hub (ICH) connected to the Intel® Q35 Northbridge through a DMI connection. The Intel® ICH9DO has six PCIe x1 ports, supports up to twelve USB 2.0 devices, six 3.0 Gbps SATA II drives with Intel® Matrix Storage Technology (ACHI, RAID 0, RAID 1, RAID 5 or RAID 10), and comes with an integrated GbE controller that is interfaced to an external RJ-45 connector. A High-Definition audio (HDA) controller can be connected to an HDA codec on an optional audio kit. Four PCI Masters provide PCI expansion capabilities on a compatible PICMG 1.3 backplane.

2.5.2 Intel® ICH9DO Features

The ICH9DO Southbridge chipset on the PCIE-Q350 has the features listed below.

- Complies with PCI Express Base Specification, Revision 11
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operations on six ports with data transfer rates up to 1.5 Gbps
- Supports twelve USB 2.0 devices with six UHCI controllers and two EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Intel® High Definition Audio
- Supports Intel® Matrix storage technology
- Contains Low Pin Count (LPC) interface
- Supports Firmware Hub (FWH) interface
- Serial Peripheral Interface (SPI) for Serial and Shared Flash
- Intel® Quiet System technology

2.5.3 Intel® ICH9DO High Definition Audio Implementation

NOTE:

The IEI® AC-KIT-883HD HDA audio kit is optional. If an IEI® AC-KIT-883HD HDA audio kit is required please contact the vendor or reseller the PCIE-Q350 was purchased from or contact and IEI® sales representative directly by sending an email to sales@iei.com.tw.

A RealTek ALC883 7.1+2 channel High Definition Audio (HDA) codec on an optional IEI® AC-KIT-883HD HDA audio kit is connected to a 10-pin onboard audio connector that is interfaced through the Intel® High Definition Audio serial link to the HDA controller integrated on the Intel® ICH9DO. The audio connector is shown in **Figure 2-9**.

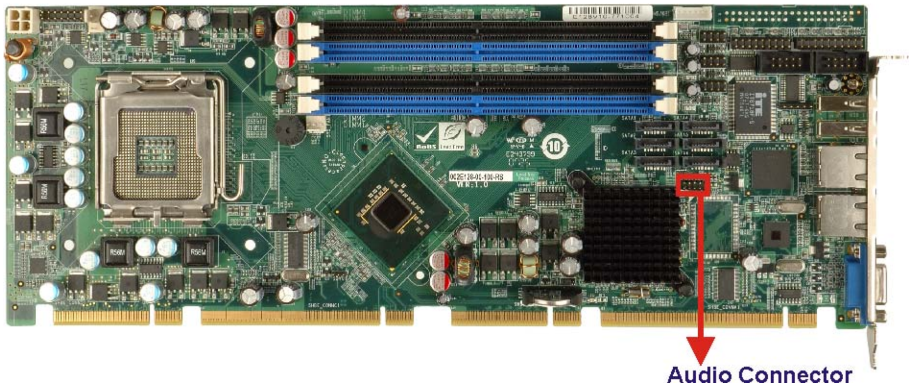


Figure 2-9: Audio Connector

NOTE:

If an HDA audio kit is going to be installed on the backplane, the HDA controller must be enabled in the BIOS settings. To enable the HDA controller please refer to **Section 6.7.2** (the

SouthBridge Configuration menu) on **page 158**.

The ALC883 codec provides 10 DAC channels that simultaneously support 7.1 sound playback, plus two channels of independent stereo sound output (multiple streaming) through the front panel stereo output. Flexible mixing, mute, and fine gain control functions provide a complete integrated audio solution for home entertainment PCs. For more information please refer to the IEI® AC-KIT-883HD HDA audio kit user manual (AC-KIT-883HD_UMN_v1.0).

2.5.4 Intel® ICH9DO Ethernet Controller

NOTE:

Gigabit Ethernet (1000 Mbps) is only supported in S0.

The Intel® ICH9DO Southbridge integrated GbE controller is interfaced to an Intel® 82566DM Gigabit LAN connect device through the Gigabit LAN Connect Interface (GLCI). The GLCI is shared with the PCIe x1 port 6. The Intel® 82566DM connects the Intel® ICH9DO Southbridge integrated GbE controller to an external RJ-45 Ethernet LAN connector to provide GbE access.

NOTE:

To enable the Intel® ICH9DO GbE Wake-on LAN function, the Wake-on LAN function must be enabled in the BIOS. Please refer to **Section 0** (the

SouthBridge Configuration menu) on **page 158**.

Some of the features of the Intel® ICH9DO GbE controller are listed below.

- Supports multi speeds including 10 Mbps, 100 Mbps and 1000 Mbps
- Can operate in full-duplex mode at all supported speeds
- Can operate at half-duplex at 10 MBps and 100 MBps
- Adheres to the IEEE 802.3x Flow Control Specification.
- Configurable LED operation for customization of LED display.
- 64-bit address master support for system using more than 4 GB of physical memory.
- Configurable receive and transmit data FIFO, programmable in 1 KB increments.
- Intelligent interrupt generation to enhance driver performance.

- Compliance with Advanced Configuration and Power Interface
- Compliance with PCI Power Management standards.
- ACPI register set and power down functionality supporting D0 & D3 states.
- Full wake-up support (APM and ACPI).
- Magic Packet wake-up enable with unique MAC address.
- Fragmented UDP checksum off load for package reassembly.
- Jumbo frames supported.

2.5.4.1 Intel® 82566DM Gigabit LAN Connect Device

One of the external RJ-45 Ethernet LAN connectors is interfaced to an Intel® 82566DM Gigabit LAN connect device. The Intel® 82566DM is a compact, single-port integrated physical layer (PHY) device interfaced directly to the Intel® ICH9DO Ethernet controller through the GLCI. The Intel® ICH9DO Ethernet controller has its own Media Access Controller (MAC). The Intel® 82566DM Gigabit LAN connect device is shown in **Figure 2-10**.

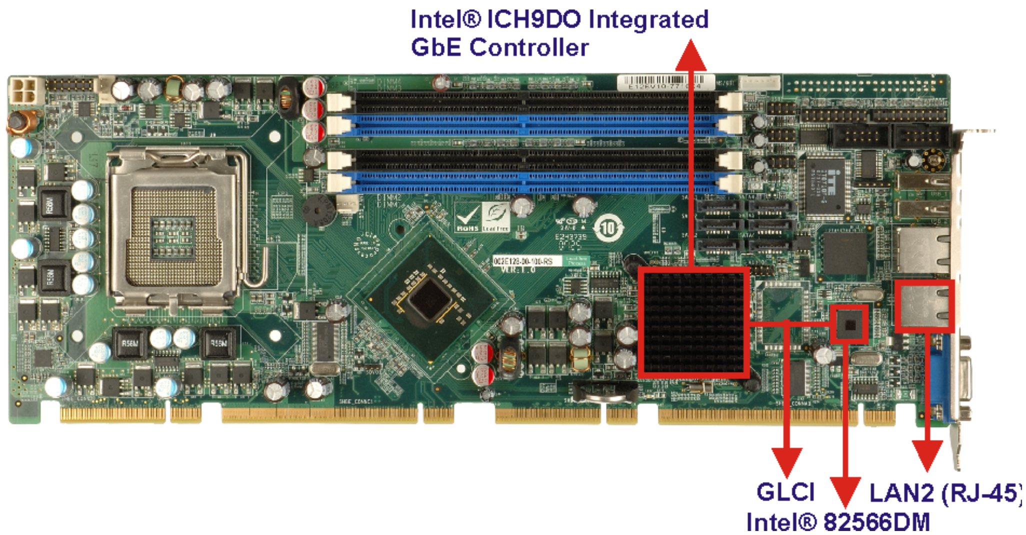


Figure 2-10: Intel® 82566DM Gigabit LAN Connect Device

Some of the features of the Intel® 82556DM are listed below:

- 10 Mbps, 100 Mbps, or 1000 Mbps
- Supports Intel® Active Management TechnologyS
- Supports Intel® Virtualization Technology through the Intel® Virtual Gigabit

Network Connection.

- Can support legacy ASF2.0.
- Shared SPI flash with system BIOS
- Integrated linear voltage regulator
- TCP/UDP checksum and segmentation offload
- Receive side scaling
- Dual TX and RX queues
- 802.1p and 802.1q

2.5.5 Intel® ICH9DO Low Pin Count (LPC) Interface

The ICH9DO LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH9DO is connected to the following components:

- BIOS chipset
- Super I/O chipset
- Trusted Platform Module (TPM) connector

2.5.6 Intel® ICH9DO PCI Interface

The PCI interface on the ICH9DO is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to four PCI bus masters

The PCI bus masters are interfaced to the following onboard components:

- Two backplane PCI channels
- One IT8209 PCI bridge

The bus masters interfaced to the two backplane PCI channels and the two PCI channels that come from the PCI bridge are all interfaced to the PCI edge connector on the bottom of the PCIE-Q350 as specified by the PICMG 1.3 form factor.

2.5.7 Intel® ICH9DO PCIe x1 Bus

The Intel® ICH9DO Southbridge chipset has six PCIe x1 lanes. The four PCIe lanes are interfaced through a PCIe edge connector at the bottom of the CPU card through a compatible half-size backplane to either four PCIe x1 expansion cards or one PCIe x4 expansion card on.

One of the remaining PCIe x1 lanes is connected to an Intel® 82566DM GbE controller and the other PCIe x1 lane is connected to an Intel® 82573L GbE controller.

For more detailed information, please refer to **Section 2.6.3**.

2.5.8 Intel® ICH9DO Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818B real time clock (RTC) integrated into the ICH9DO. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.5.9 Intel® ICH9DO SATA Controller

NOTE:

That SATA drive mode is set in the BIOS. Please refer to the **Section 6.3.2** on **IDE Configuration** on **page 115** and **Section 6.3.5.1** on **AHCI Configuration** on **page 131**.

The ICH9DO SATA supports three modes of operation:

- ***Native IDE enabled operating system***: Two controllers enable all six ports on the bus. Controller 1 supports Port 0, Port 1, Port 2 and Port 3. Controller 2 supports Ports 4 and Port 5.
- ***Legacy operating system is used***: One controller is enabled and only supports Port 0, Port 1, Port 2 and Port 3.

- ***AHCI or RAID mode***: One controller supports all six ports including, Port 0, Port 1, Port 2, Port 3, Port 4 and Port 5.

In the AHCI or RAID mode, 3.0 Gbps data transfer speeds are supported. The SATA drive connectors are shown in **Figure 2-11**.

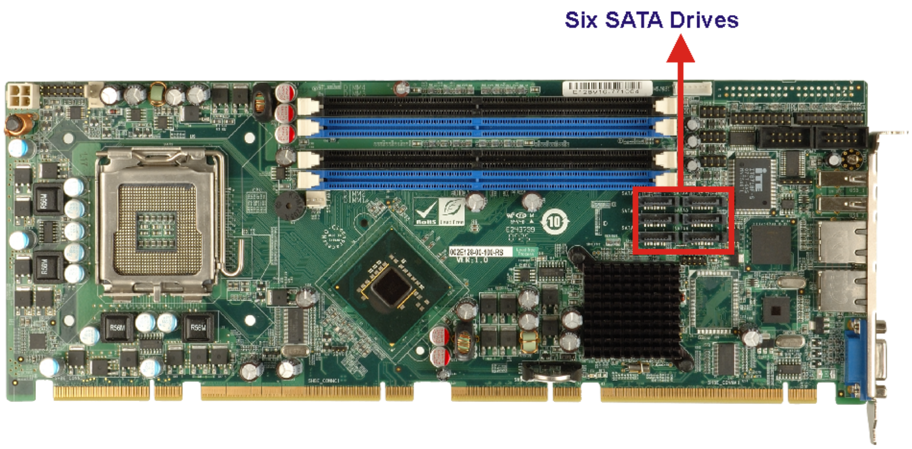


Figure 2-11: SATA Drive Connectors

2.5.10 Intel® ICH9DO Serial Peripheral Interface (SPI) BIOS

The 4-pin SPI is connected to an SPI BIOS chip. A licensed copy of AMI BIOS is preinstalled on the SPI BIOS chip. A master-slave protocol is used for communication on the SPI bus. The slave is connected to the Intel® ICH9DO Southbridge and is implemented as a tri-state bus.

2.5.11 Intel® ICH9DO USB Controller

2.5.11.1 Intel® ICH9DO USB Controller Overview

The ICH9DO comprises six full/low speed USB controllers that support the standard Universal Host Controller Interface (UHCI) Revision 1.1. Each controller supports two USB devices ensuring up to twelve USB 1.1 devices can be connected to the PCIE-Q350.

The ICH9DO also comprises two high-speed Enhanced Host Controller Interface (EHCI) controllers. Each EHCI controller supports six USB 2.0 devices ensuring twelve USB 2.0

devices can be connected to the PCIE-Q350. EHCI controllers facilitate data transfer speeds of 480 Mbps

Port routing logic on the ICH9DO determines whether a UHCI or an EHCI controller controls a USB port.

2.5.11.2 PCIE-Q350 USB Implementation

Only eight of the Intel® ICH9DO USB ports are implemented on the PCIE-Q350. Two USB ports (USB Port 1 and USB Port 2) are connected to two external connectors and six USB ports (USB Port 3 to USB Port 8) are connected to three 8-pin onboard pin-headers. See **Figure 2-12**.

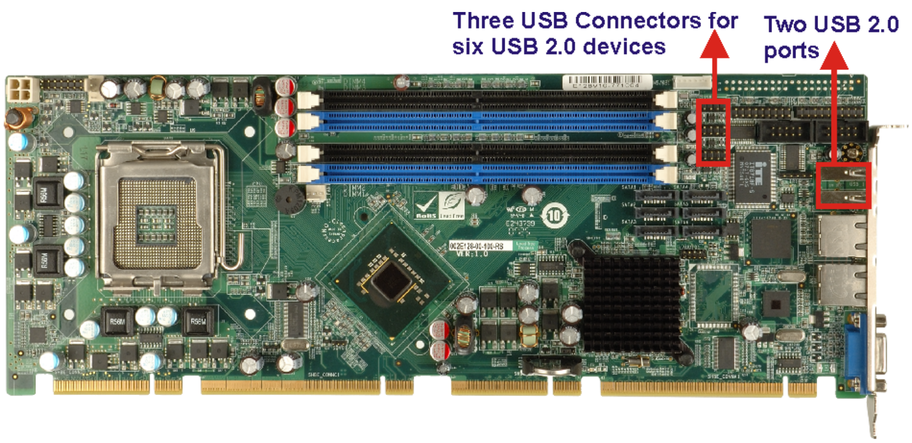


Figure 2-12: Onboard USB Implementation

2.5.11.3 Backplane USB Implementation

The remaining four Intel® ICH9DO USB ports (USB Port 9 to USB Port 8) are interfaced to the backplane through the USB edge connector on the bottom of the CPU card. See **Figure 2-13**. These four remaining USB ports are implemented through connectors on the backplane.

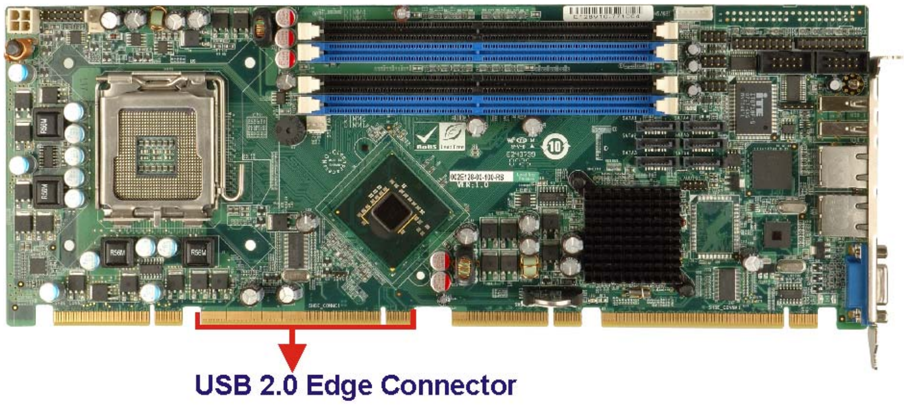


Figure 2-13: USB Edge connector

2.6 PCIE-Q350 PCIe Bus Components

2.6.1 PCIe Bus Overview

The PCIE-Q350 has one PCIe x16 channel from the Intel® Q35 Northbridge and six PCIe x1 lanes from the Intel® ICH9DO Southbridge. The PCIe bus lanes are interfaced to the following devices.

- One PCIe x16 lane is connected to one PCIe x16 graphics card on a compatible backplane
- Four PCIe x1 lanes are connected to four PCIe x1 expansion cards on a compatible backplane
- One PCIe x1 lanes are connected to two Intel® PCIe GbE connectors
- One PCIe x1 is shared with the Intel® ICH9DO Gigabit LAN Connect Interface (GLCI), which is connected to a Intel® 82566DM Gigabit platform LAN connect device

2.6.2 PCIe x16 Expansion

The Intel® Q35 Northbridge chipset has one PCIe x16 port reserved for a PCIe x16 graphics card. The PCIe x16 lane is interfaced to a PCIe x16 slot on a compatible backplane through two separate edge connectors on the bottom of the CPU card. The PCIe x16 graphics card is then installed on the PCIe x16 slot on the backplane. The PCIe x16 edge connector is shown in **Figure 2-14**.

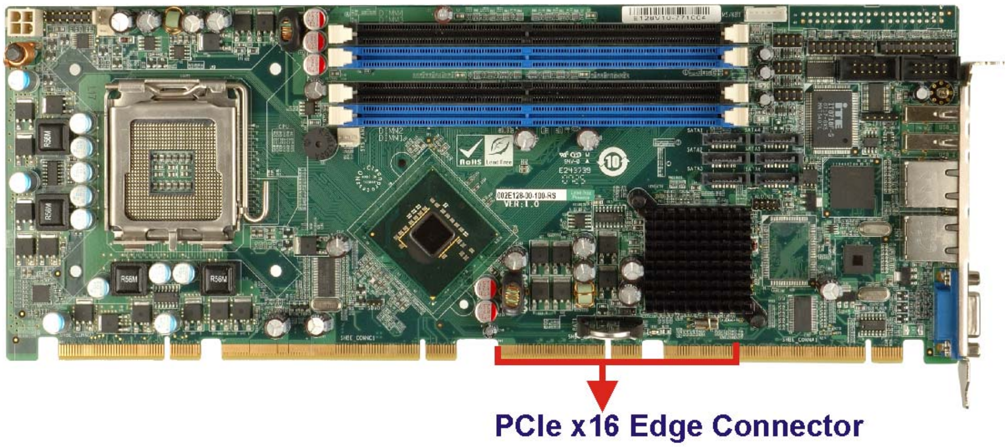


Figure 2-14: PCIe x16 Edge connector

2.6.3 PCIe x1 Expansion

Four of the six PCIe x1 expansion channels on the PCIE-Q350 are interfaced to four PCIe x1 connectors on a backplane through an edge connector on the bottom of the CPU card. The PCIe x1 edge connector is shown in **Figure 2-15**.

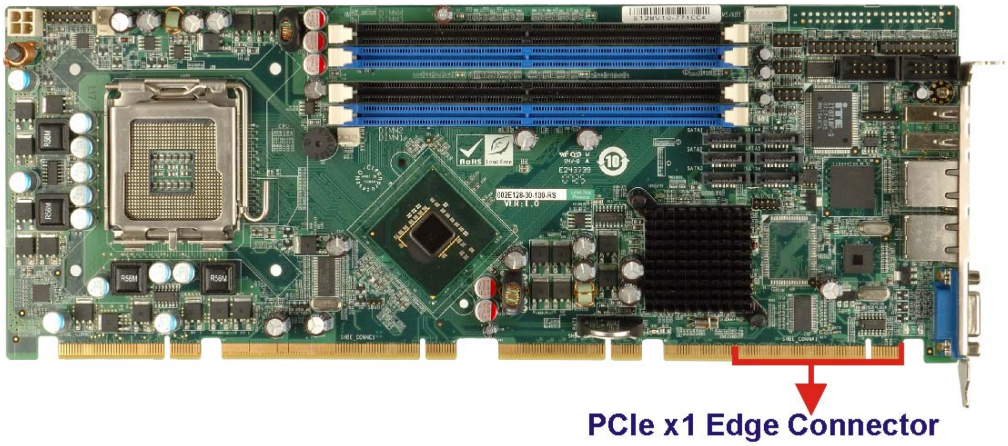


Figure 2-15: PCIe x1 Edge connector (Four Lanes)

2.6.4 Intel® 82573L PCIe GbE Controller

An RJ-45 Ethernet LAN connector is interfaced directly to an Intel® 82573L PCIe GbE controller. The Intel® 82573L PCIe GbE controller is a compact, single-port integrated

physical layer (PHY) device with its own Memory Access Controller (MAC) and interfaced to the Intel® ICH9DO Southbridge through a PCIe x1 lane. The Intel® 82573L GbE controllers is shown in **Figure 2-16** below.

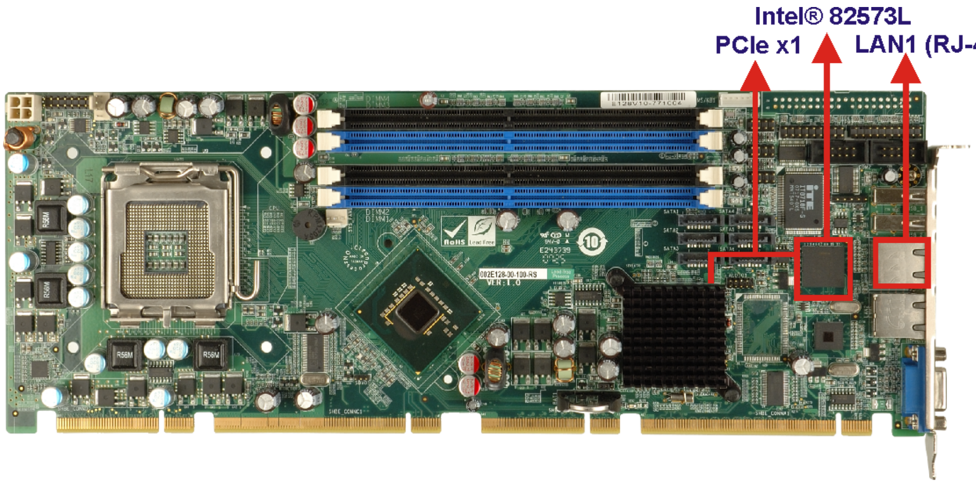


Figure 2-16: Intel® 82573L PCIe GbE Controller

Some of the features of the Intel® 82573L are listed below:

- 2 Gbps peak bandwidth per direction
- PCI Express Rev 1.0a specification
- High bandwidth density per pin
- Wide,pipelined internal data path architecture
- Optimized transmit (Tx) and receive (Rx) queues
- 32 KB configurable Rx and Tx first-in/first-out (FIFO)
- IEEE 802.3x*-compliant flow-control support with software controllable pause times and threshold values
- Programmable host memory Rx buffers (256 B-16 KB)
- Descriptor ring management hardware for Tx and Rx
- Mechanism for reducing interrupts from Tx/Rx operations
- Integrated PHY for 10/100/1000 Mbps (full- and half-duplex)
- IEEE 802.3ab* auto-negotiation support
- IEEE 802.3ab PHY compliance and compatibility
- Tx/Rx IP,TCP,and UDP checksum offloading
- Tx TCP segmentation
- IEEE 802.1q* Virtual Local Area Network (VLAN) support with VLAN tag

insertion, stripping, and packet filtering for up to 4096 VLAN tags

- Boot ROM Preboot eXecution Environment (PXE) Flash interface support
- SDG 3.0,WfM 3.0 and PC2001 compliant
- Wake on LAN support

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

The PCI bus is connected to the components listed below:

- ITE IT8211 ATA controller chipset
- IT8209R PCI arbiter
- PCI edge connector

The PCI bus complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations.

2.7.2 ITE IT8209 PCI Arbiter

One of the Intel® ICH9DO Southbridge PCI lanes is connected to an ITE IT8209 PCI arbiter. One set of SYSGNT# and SYSREQ# on the ITE IT8209 supports three PCI Masters thereby enabling the PCIE-Q350 to support an additional two PCI Masters. The ITE IT8209 PCI arbiter is shown in **Figure 2-17** below.

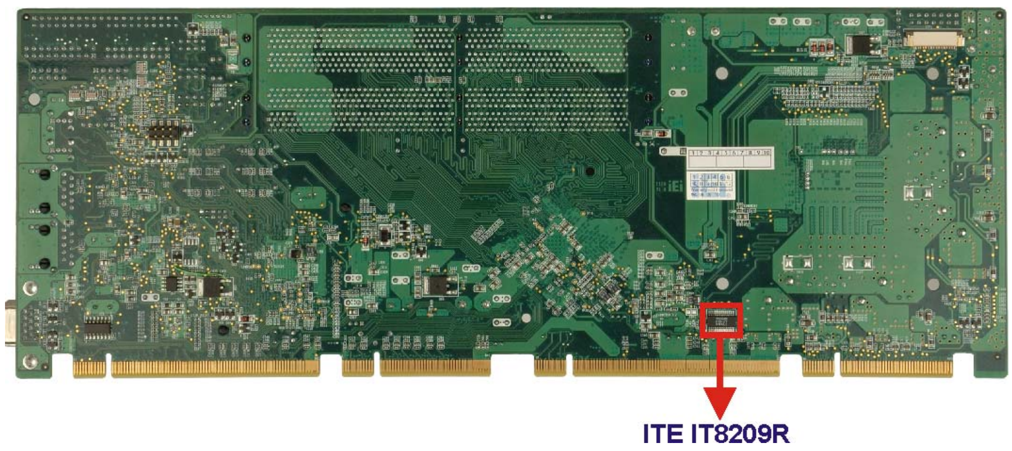


Figure 2-17: PCI Arbiter

One of the PCI masters on the ITE IT8209 PCI arbiter is connected to the Intel® ICH9DO Southbridge. The remaining two are connected to the PCI edge connector to facilitate PCI expansion on the backplane. Some of the features of the ITE IT8209 PCI arbiter are listed below:

- Extended PCI Arbiter
- Input PCI Clock
- Clock Buffer

2.7.3 PCI Interface Edge connector

The PCI interface edge connector is connected to two PCI Masters on the ICH9DO Southbridge and to two PCI masters on the ITE IT8209 PCI arbiter. The PCI bus edge connector on the PCIE-Q350 is interfaced to the PCI bus on the backplane thereby connecting the PCI backplane expansion boards to the Intel® ICH9DO Southbridge. The PCI bus edge connector is shown in **Figure 2-18**.

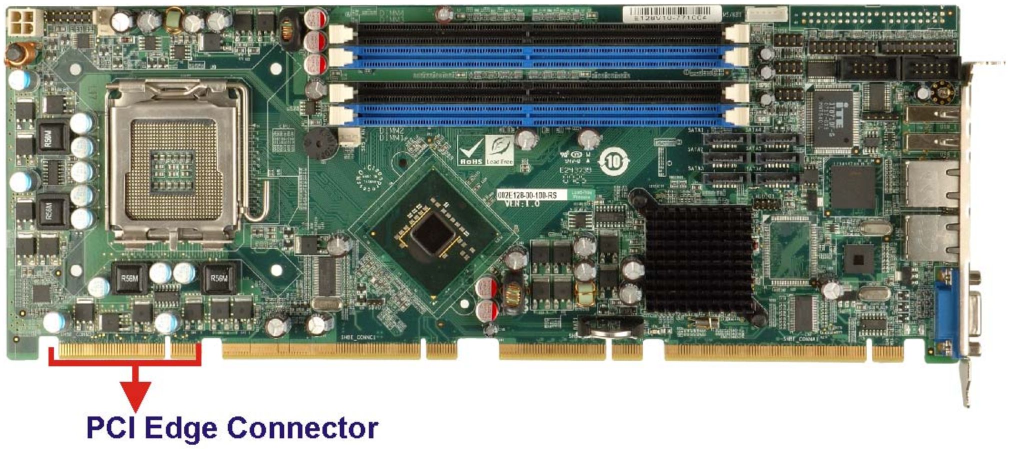


Figure 2-18: PCI Edge connector Connection

The PCI is interfaced to four standard PCI expansion cards a compatible PICMG 1.3 backplane.

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- TPM module connector
- Super I/O chipset

2.8.2 TPM Module

A TPM connector on the PCIE-Q350 is interfaced to the Intel® ICH9DO Southbridge through the LPC bus. The TPM connector is shown in **Figure 2-19** below.

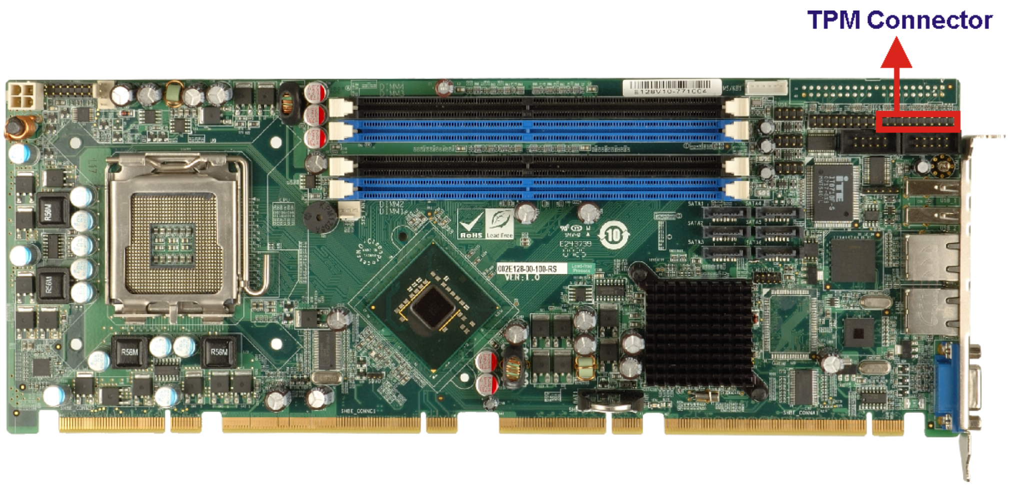


Figure 2-19: TPM Connector

The Intel® ICH9DO Southbridge supports TPM version 1.1 and TPM version 1.2 devices for enhanced security. Three TPM are available from IEI. The three IEI TPM are listed below:

- Infineon TPM module
- Sinosun TPM module
- Winbond TPM module

For more information about these modules please refer to Chapter 3 or contact the PCIE-Q350 reseller or vendor. Alternatively, please contact IEI at sales@iei.com.tw.

2.8.3 Super I/O chipset

The ITE IT8718F Super I/O chipset is connected to the Intel® ICH9DO Southbridge through the LPC bus. ITE IT8718F Super I/O chipset is shown in **Figure 2-20** below.

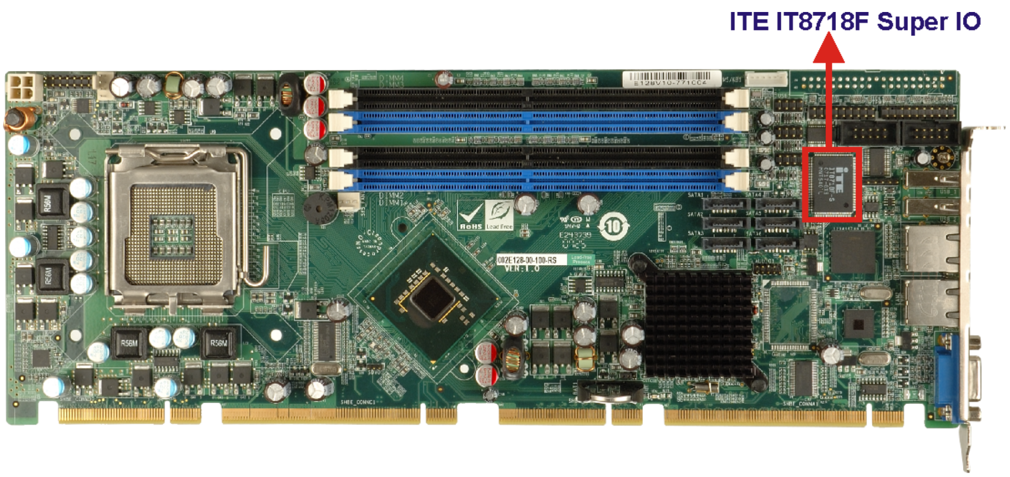


Figure 2-20: ITE IT8718F Super I/O

The ITE IT8718F is an LPC interface-based Super I/O device that comes with an integrated Environment Controller. Some of the features of the iTE IT8718F chipset are listed below:

- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Multi curve for one fan control
- Multi sensor for one fan control
- Single +5V Power Supply
- Two 16C550 UARTs for serial port control
- Keyboard Controller
- 48 General Purpose I/O Pins
- Watchdog Timer
- Serial IRQ Support
- SmartGuardian Controller
- ITE automatic power-failure resume and power button debounce

Some of the Super I/O features are described in more detail below:

2.8.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.8.3.2 Super I/O 16C550 UARTs

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports (COM1 and COM2)
- IrDa 1.0 and ASKIR protocols

2.8.3.3 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.8.3.4 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.8.3.5 Super I/O Keyboard and Mouse Controller

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported

- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset
- 8-bit timer/counter

The keyboard and mouse controller controller is interfaced to a keyboard and mouse connected to the backplane through the board-to-board connectors.

2.8.3.6 Super I/O GPIO Ports

The Super I/O has 48 programmable GPIO ports of which 16 are implemented on the PCIE-Q350. The GPIO connector has 16 programmable bits, 8-bit input and 8-bit output.

2.8.3.7 Super I/O Infrared

The Super I/O has dedicated infrared (IrDA) pins that are interfaced to an IrDA connector. The IrDA connector is compatible with the following standards:

- ASKIR
- SIR

2.8.4 Super I/O Watchdog Timer

The super I/O wathdog timer has a maximum time resolution of 1 minute or 1 second with a maximum or either 65,535 minutes or 65,535 seconds.

2.9 Ethernet LAN Controllers

The PCIE-Q350 CPU card has two GbE controllers. The PCIE-Q350 LAN connections are shown in **Figure 2-21**.

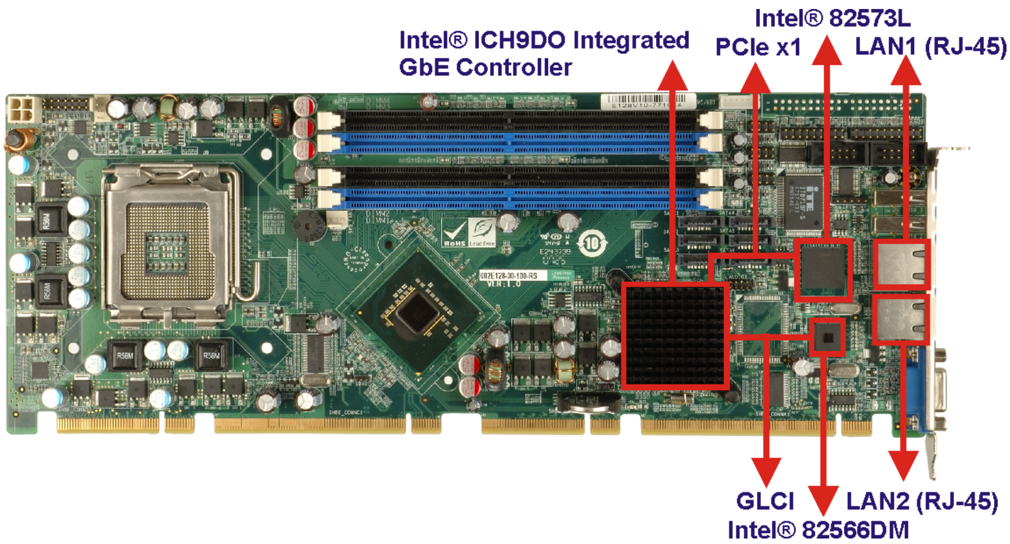


Figure 2-21: LAN Connections

The first GbE controller, is an Intel® 82537L PCIe GbE controller and is the interface between the Intel® ICH9DO Southbridge controller and the LAN1 RJ-45 Ethernet connector.

The second GbE controller is integrated on the Intel® ICH9DO Southbridge and interfaced to the LAN2 RJ-45 Ethernet LAN connector through an Intel® 82566DM Gigabit Platform LAN Connect device. The Intel® 82566DM is connected directly to the GbE controller on the Intel® ICH9DO Southbridge through the GLCI, which is shared with the PCIe x1 port 6.

Both of these Ethernet controllers have been described in detail in earlier sections. For further details please refer to the relevant sections:

- Intel® ICH9DO Ethernet controller (**Section 2.5.4**)
- Intel® 82566DM Gigabit Platform LAN Connect device (**Section 2.5.4.1**)
- Intel® 82537L PCIe GbE controller (**Section 2.6.4**)

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the PCIE-Q350 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- CPU Temperature
- System Temperature

Five voltage inputs on the PCIE-Q350 Super I/O Enhanced Hardware Monitor monitors the following voltages:

- CPU Core
- +1.80V
- +3.30V
- +12.0V
- 5VSB
- VBAT

The PCIE-Q350 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- Fan Speed1 (CPU Fan)
- Fan Speed2 (System Fan)

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the PCIE-Q350 are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

2.10.3 Power Consumption

Table 2-3 shows the power consumption parameters for the PCIE-Q350 running 3D Mark® 2001 SE330 with a 2.66 GHz E6700 Intel® Core™2 Duo processor with a 1066 MHz FSB and four 2.0GB 667MHz DDR2 DIMMs.

Voltage	Current
+3.3V	3.0A
+5.0V	5.1A
+12V	4.23A
5Vsb	0.28A

Table 2-3: Power Consumption

2.11 Expansion Options

2.11.1 Expansion Options Overview

A number of compatible IEI Technology Corp. PICMG 1.3 backplanes and chassis can be used to develop and expanded system. These backplanes and chassis are listed below.

2.11.2 IEI Expansion PICMG 1.3 Backplanes

The backplanes listed in **Table 2-4** are compatible with the PCIE-Q350 and can be used to develop highly integrated industrial applications. All of the backplanes listed below have 24-pin ATX connector and a 4-pin ATX connector. For more information about these backplanes please consult the IEI catalog or contact your vendor, reseller or the IEI sales team at sales@iei.com.tw.

Model	Total Slots	System	Expansion Slots				System Type
			PCIe			PCI	
			x16	x4	x1		
PE-4S2	4	One	1	-	-	2	Single
PE-4S3	4	One	1	-	2	-	Single
PE-5S2	5	One	1	-	3	-	Single
PE-6S-R20	6	One	1	-	-	3	Single
PE-6S3	6	One	1	-	3	1	Single
PE-6SD	5	One	1	-	3	-	Single
PE-6SD2	5	One	1	-	2	1	Single
PE-7S	7	One	1	-	2	3	Single
PE-7S2	7	One	1	-	4	1	Single
PE-8S	8	One	1	-	3	3	Single
PE-9S	9	One	1	-	4	3	Single
PE-10S-R20	10	One	1	-	4	4	Single
PE-10S2	10	One	1	-	4	4	Single
PXE-13S	13	One	1	-	3	8	Single
PXE-19S	19	One	1	-	1	16	Single

Table 2-4: Compatible IEI PICMG 1.3 Backplanes

2.11.3 IEI Chassis

IEI chassis available for PCIE-Q350 system development are listed in **Table 2-5**.

For more information about these chassis please consult the IEI catalog or contact your vendor, reseller or the IEI sales team at sales@iei.com.tw.

Model	Slot SBC	Mounting	Max Slots	Backplanes
PAC-42GF-R20	Full-size	Wall	4	PE-4S PE-4S2 PE-4S3
PACO-504F	Full-size	Wall	4	PE-4S PE-4S2 PE-4S3

Model	Slot SBC	Mounting	Max Slots	Backplanes
PAC-106G-R20	Full-size	Wall	6	PE-5S PE-5S2 PE-6S2 PE-6S3
PAC-107G-R20	Full-size	Wall	6	PE-5S PE-5S2 PE-6S2 PE-6S3
RACK-500G-R20	Full-size (4U)	Rack	5	PE-5S PE-5S2
RACK-305G-R20	Full-size (4U)	Rack	14	PE-6S-R20 PE-10S-R20 PE-10S2 PXE-13S PXE-19S
RACK-360G-R20	Full-size (4U)	Rack	14	PE-6S-R20 PE-10S-R20 PE-10S2 PXE-13S
RACK-814G-R20	Full-size (4U)	Rack	14	PE-6S-R20 PE-10S-R20 PE-10S2 PXE-13S
RACK-3000G-R20	Full-size (4U)	Rack	14	PE-6S-R20 PE-10S-R20 PE-10S2 PXE-13S PXE-19S
PAC-1700G-R20	Full-size	Wall	7	PE-6S-R20 PE-7S PE-7S2
PAC-125G-R20	Full-size	Wall	10	PE-6S-R20 PE-8S

Model	Slot SBC	Mounting	Max Slots	Backplanes
PAC-1000G-R20	Full-size	Wall	6	PE-6S2 PE-6S3
PACO-506F	Full-size	Wall	6	PE-6S2 PE-6S3
RACK-221G	Full-size (2U)	Rack	6	PE-6SD PE-6SD2
RACK-2100G	Full-size (2U)	Rack	6	PE-6SD PE-6SD2

Table 2-5: Compatible IEI Chassis

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Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the PCIE-Q350 may result in permanent damage to the PCIE-Q350 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PCIE-Q350. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PCIE-Q350, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the PCIE-Q350, place it on an antic-static pad. This reduces the possibility of ESD damaging the PCIE-Q350.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the PCIE-Q350 is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 3.1.
- Make sure the packing box is facing upwards so the PCIE-Q350 does not fall out of the box.
- Make sure all the components shown in Section 3.3 are present.

3.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PCIE-Q350 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The PCIE-Q350 is shipped with the following components:

Quantity	Item and Part Number	Image
1	PCIE-Q350 CPU Card	
1	Dual RS-232 cable (**P/N**: 19800-000051-RS)	
1	KB/MS cable with Mini DIN	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-000138-RS)	

4	SATA cables (**P/N**: 32000-062800-RS)	
2	SATA power cables (**P/N**: 32100-088600-RS)	
1	Mini jumper Pack	
1	Quick Installation Guide	
1	Utility CD	
1	USB cable (**P/N**:CB-USB02-RS)	

Table 3-1: Package List Contents

3.4 Optional Items

Audio kit (**P/N**: AC-KIT-833HD-R10)	
5-pin Wafer-to-PS/2 (**P/N**: 320000-000075-RS)	
4-port USB cable (**P/N**: CB-USB04-RS)	
CPU cooling kit (**P/N**: CF-520-RS)	
CPU cooling kit (**P/N**: CF-775A-RS)	
Infineon TPM module (**P/N**: TPM-IN01-R10)	
Sinosun TPM module (**P/N**: TPM-SI01-R10)	

Winbond TPM module (**P/N**: TPM-WI01-R10)	

Table 3-2: Package List Contents

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.2 shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.2**.

4.1.1 PCIE-Q350 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

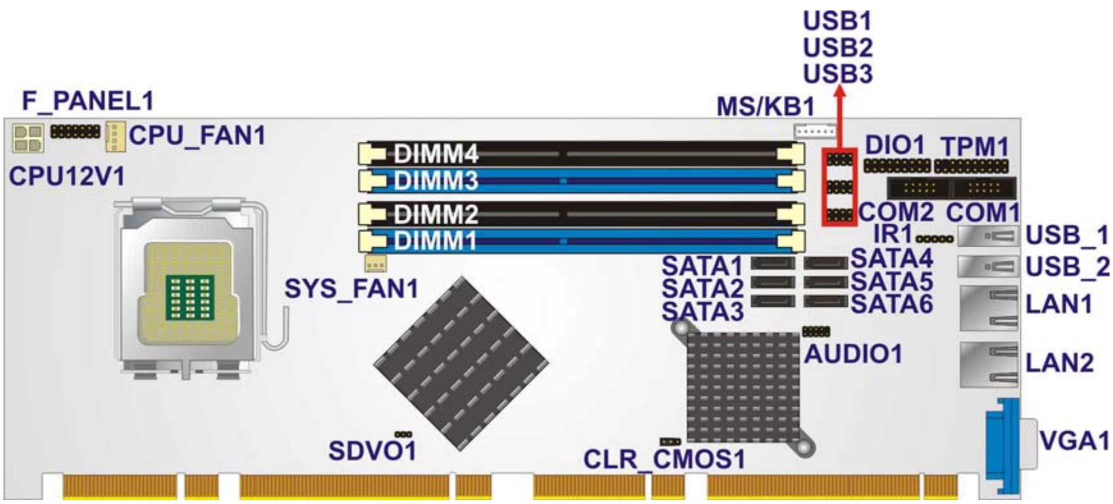


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the PCIE-Q350. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power connector	4-pin ATX connector	CPU12V1
Audio connector	10-pin header	AUDIO1
Cooling fan connector, CPU	4-pin wafer	CPU_FAN1
Cooling fan connector, System	3-pin wafer	CPU_SYS1

Digital input/output connector	10-pin header	DIO1
Keyboard and mouse connector	6-pin wafer	KB/MS1
Front panel connector	10-pin header	F_PANEL1
Infrared (IrDA) connector	5-pin header	IR1
SDVO connector	3-pin header	SDVO1
Serial ATA drive connector	7-pin SATA	SATA1
Serial ATA drive connector	7-pin SATA	SATA2
Serial ATA drive connector	7-pin SATA	SATA3
Serial ATA drive connector	7-pin SATA	SATA4
Serial ATA drive connector	7-pin SATA	SATA5
Serial ATA drive connector	7-pin SATA	SATA6
Serial port connector (COM1)	10-pin box header	COM1
Serial port connector (COM2)	10-pin box header	COM2
TPM connector	20-pin header	TPM1
USB connectors	8-pin header	USB1
USB connectors	8-pin header	USB2
USB connectors	8-pin header	USB3

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the PCIE-Q350. Detailed descriptions of these connectors can be found in **Section 4.3** on **page 75**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
USB connector	USB port	USB_1
USB connector	USB port	USB_2
VGA connector	Female DB-15	VGA1

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the PCIE-Q350.

4.2.1 ATX Power Connector

CN Label: CPU12V1

CN Type: 4-pin ATX power connector (1x4)

CN Location: See Figure 4-2

CN Pinouts: See Table 4-3

The 4-pin ATX power connector is connected to an ATX power supply and powers the CPU.

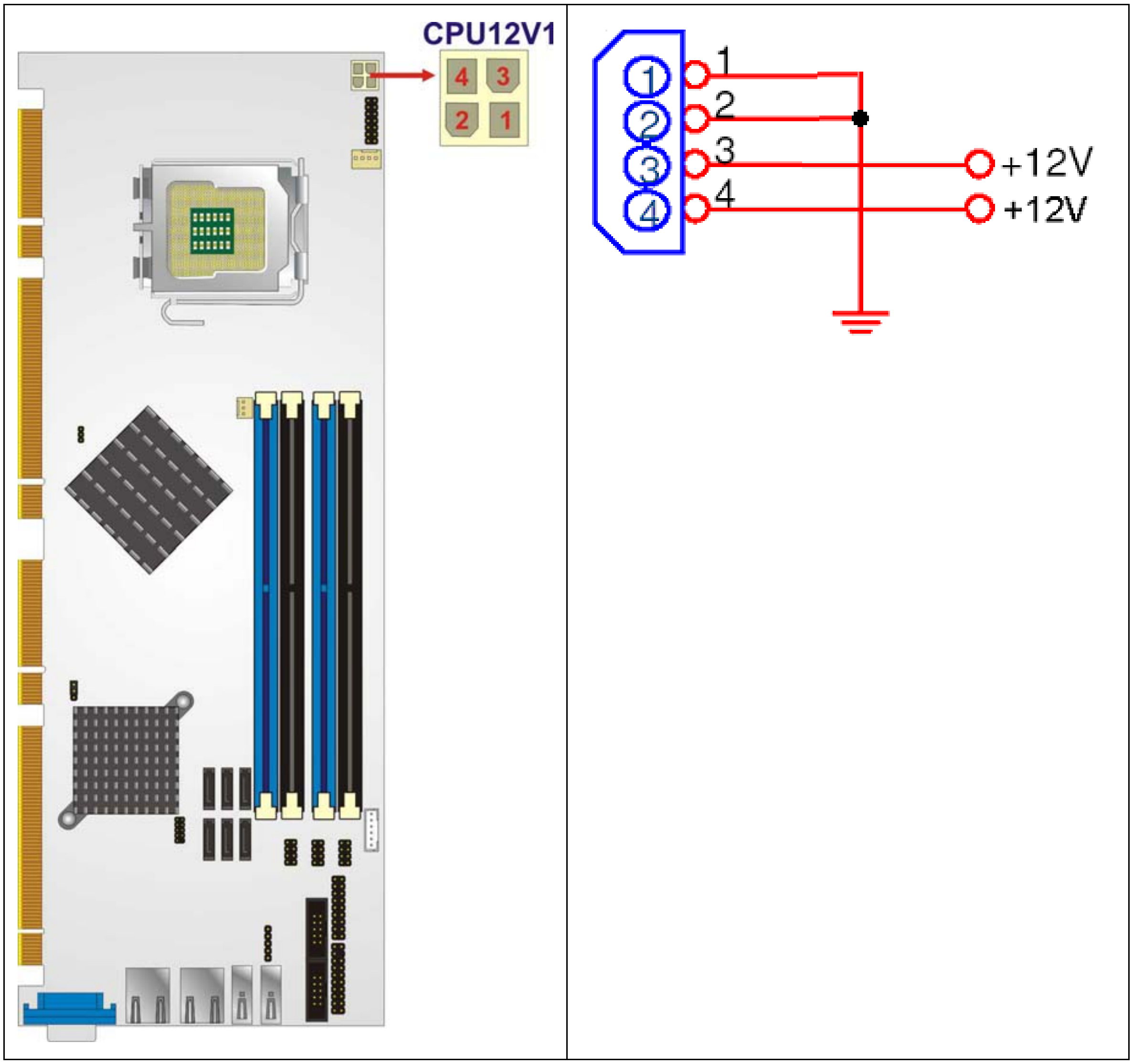


Figure 4-2: ATX Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 4-3: AT Power Connector Pinouts

4.2.2 Audio Connector

CN Label: AUDIO1

CN Type: 9-pin header (2x5)

CN Location: See Figure 4-3

CN Pinouts: See Table 4-4

NOTE:

The IEI® AC-KIT-883HD HDA audio kit is optional. If an IEI® AC-KIT-883HD HDA audio kit is required please contact the vendor or reseller the PCIE-Q350 was purchased from or contact and IEI® sales representative directly by sending an email to sales@iei.com.tw.

The 9-pin audio connector is interfaced on the one side to the high-definition audio (HDA) controller on the Intel® ICH9DO Southbridge and to an external HDA codec.

NOTE:

If an HDA audio kit is going to be installed on the backplane, the HDA controller must be enabled in the BIOS settings. To enable the HDA controller please refer to **Section 6.7.2** (the

SouthBridge Configuration menu) on **page 158**.

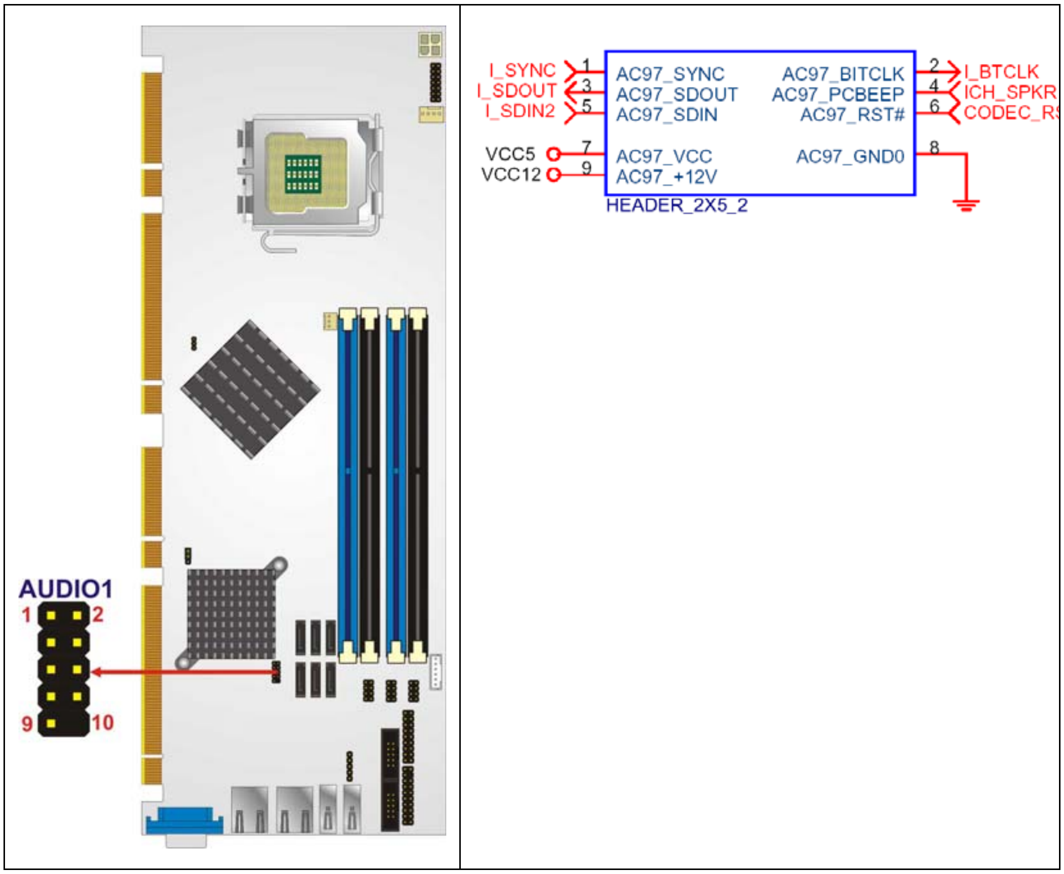


Figure 4-3: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12V	10	N/C

Table 4-4: Audio Connector Pinouts

4.2.3 Digital Input/Output (DIO) Connector

CN Label: DIO1

CN Type: 18-pin header (2x9)

CN Location: See Figure 4-4

CN Pinouts: See Table 4-5

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable. To see details on how to program the DIO chip, please refer to **Appendix B**.

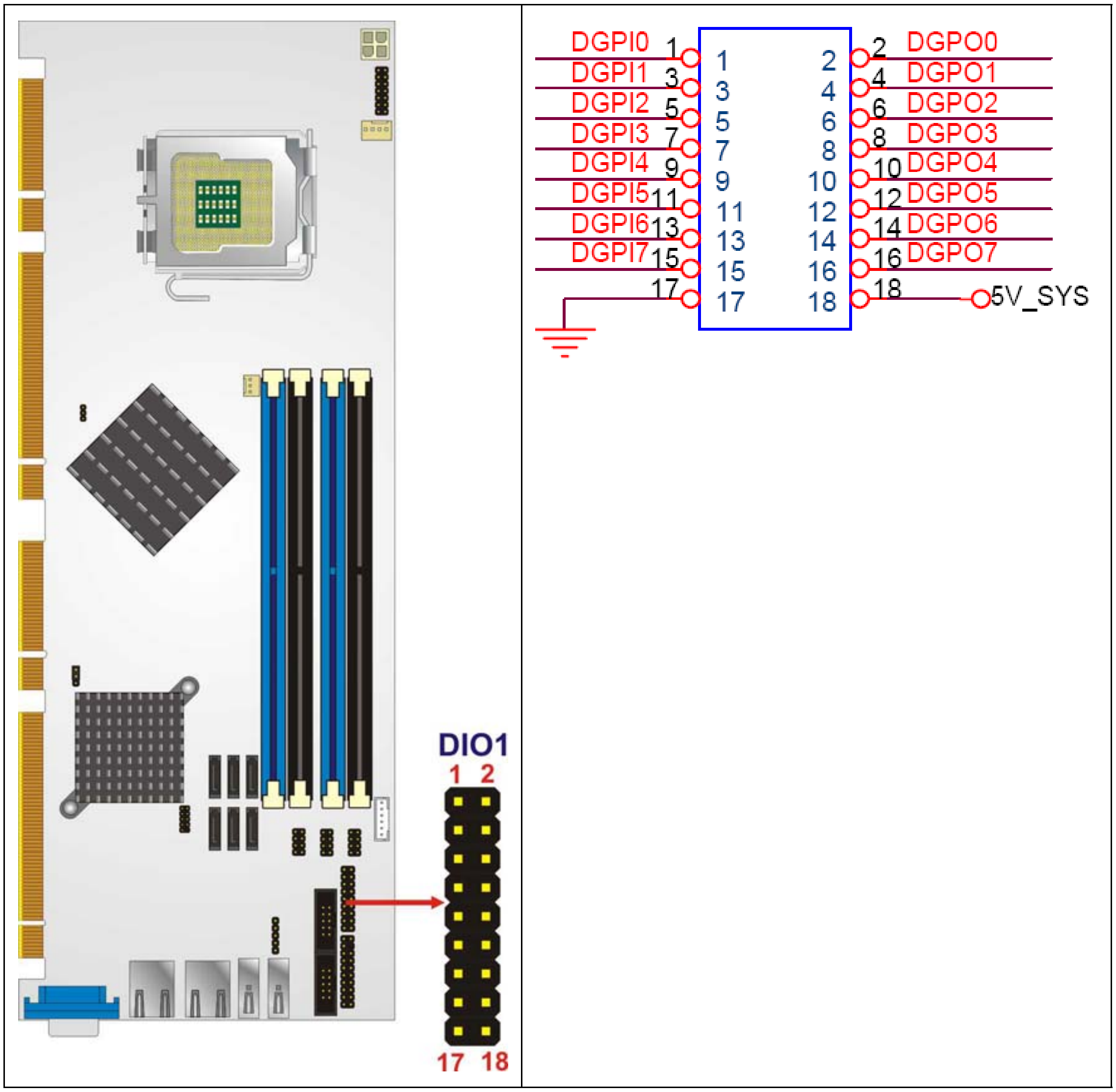


Figure 4-4: DIO Connector Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Input 0	2	Output 0
3	Input 1	4	Output 1
5	Input 2	6	Output 2
7	Input 3	8	Output 3
9	Input 4	10	Output 4
11	Input 5	12	Output 5
13	Input 6	14	Output 6
15	Input 7	16	Output 7
17	GND	18	+5V

Table 4-5: DIO Connector Connector Pinouts

4.2.4 Fan Connector, CPU (12V, 4-pin)

CN Label: CPU_FAN1

CN Type: 3-pin header

CN Location: See Figure 4-5

CN Pinouts: See Table 4-6

The CPU cooling fan connector provides a 12V, 500mA current to a CPU cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

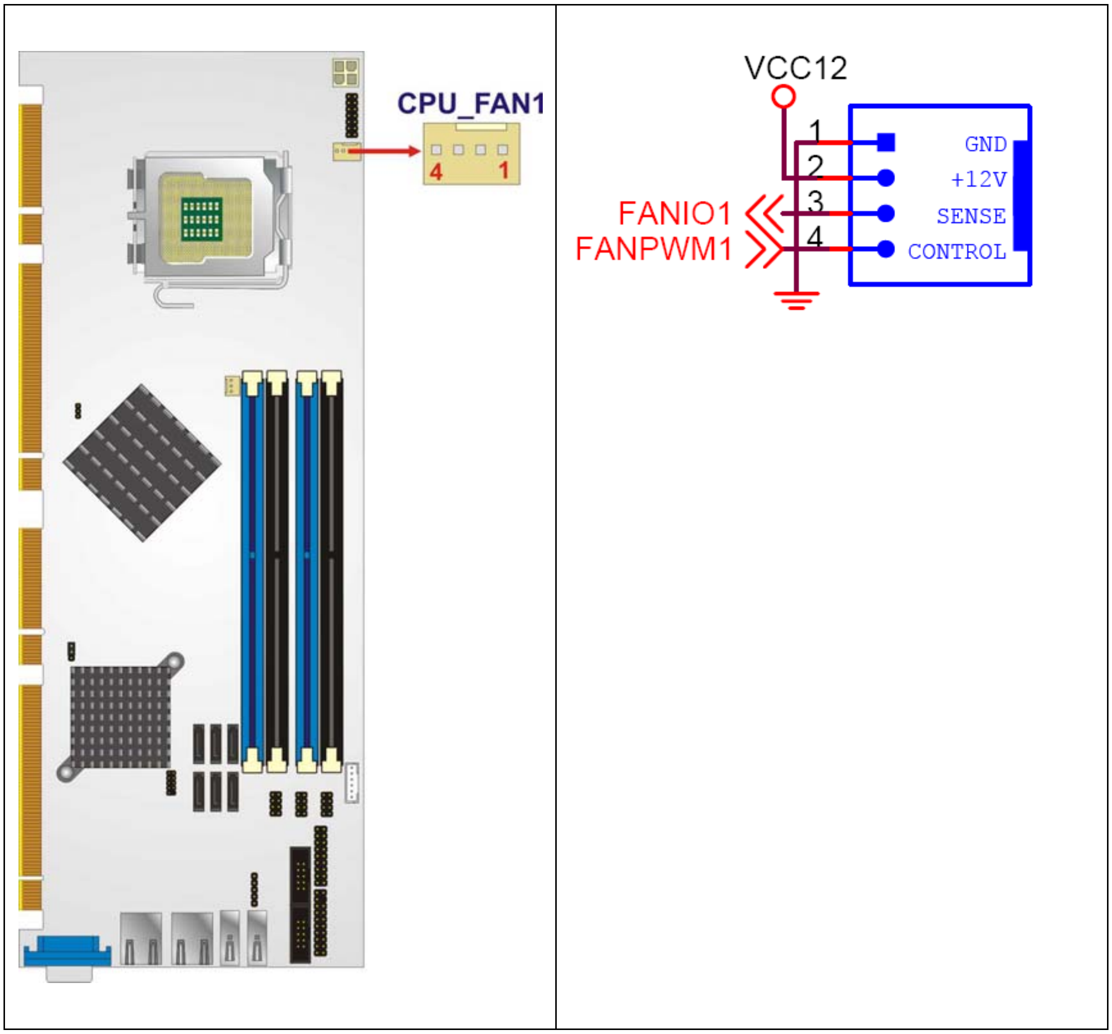


Figure 4-5: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12VCC
3	Rotation Signal
4	Control

Table 4-6: +12V Fan Connector Pinouts

4.2.5 Fan Connector, System (+12V)

CN Label: SYS_FAN1

CN Type: 3-pin header

CN Location: See Figure 4-6

CN Pinouts: See Table 4-7

The system cooling fan connector provides a 12V, 500mA current to a system cooling fan.. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

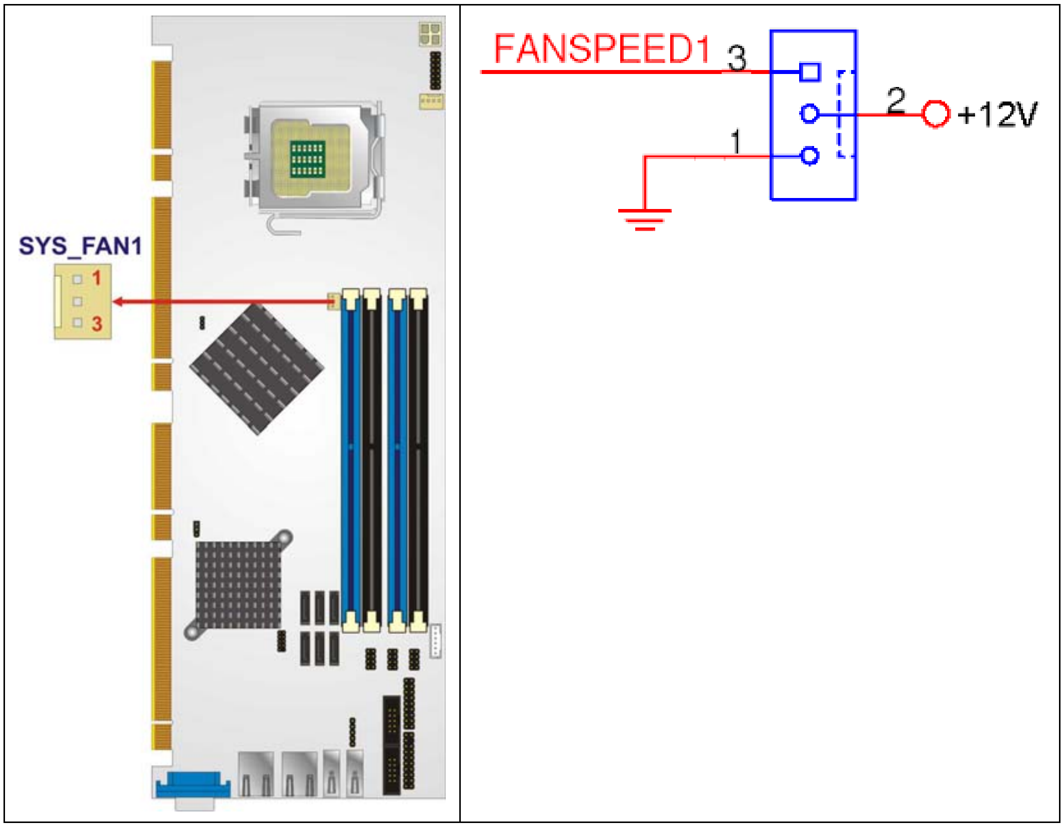


Figure 4-6: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Rotation Signal

Table 4-7: +12V Fan Connector Pinouts

4.2.6 Front Panel Connector (14-pin)

CN Label: F_PANEL1

CN Type: 12-pin header (2x6)

CN Location: See Figure 4-7

CN Pinouts: See Table 4-8

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power LED
- Speaker
- Power button
- Reset
- HDD LED

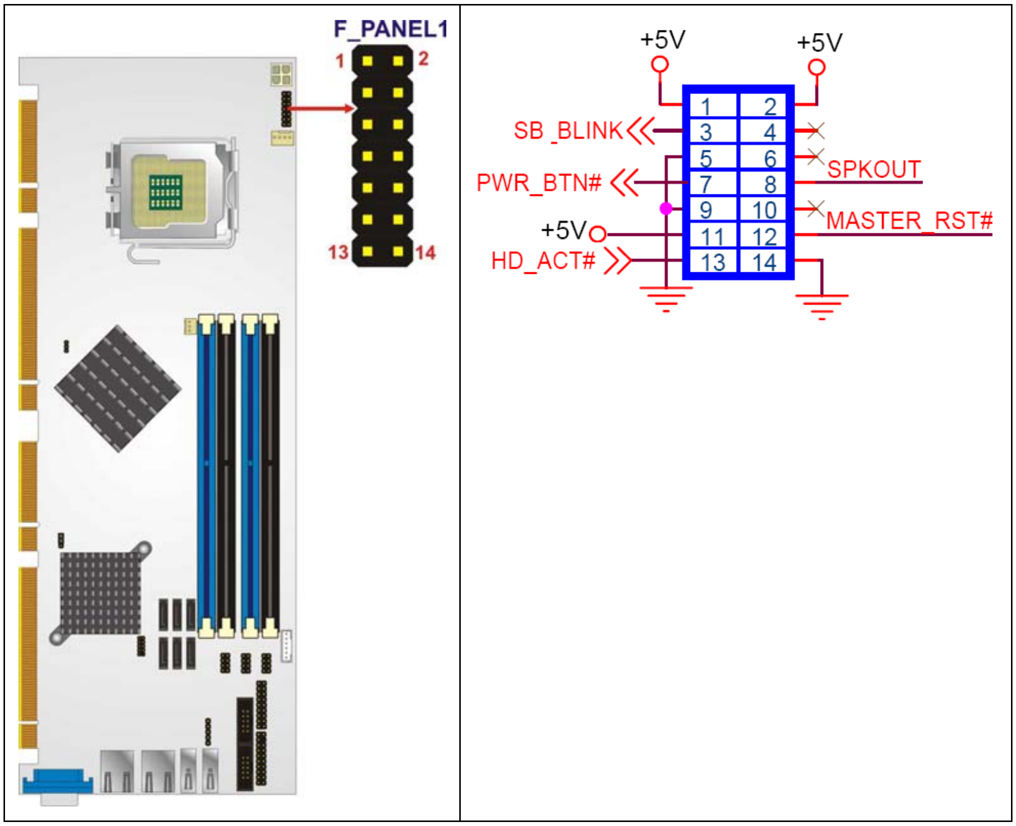


Figure 4-7: Front Panel Connector Pinout Locations (14-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	LED+	Speaker	2	SPEAKER+
	3	N/C		4	N/C
	5	LED-		6	N/C
Power Button	7	PWRBTSW+		8	SPEAKER -
	9	PWRBTSW-	Reset	10	N/C
HDD LED	11	IDE LED+		12	RESET+
	13	IDE LED-		14	RESET-

Table 4-8: Front Panel Connector Pinouts (14-pin)

4.2.7 Infrared Interface Connector (5-pin)

CN Label: IR1

CN Type: 5-pin header (1x5)

CN Location: See Figure 4-8

CN Pinouts: See Table 4-9

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

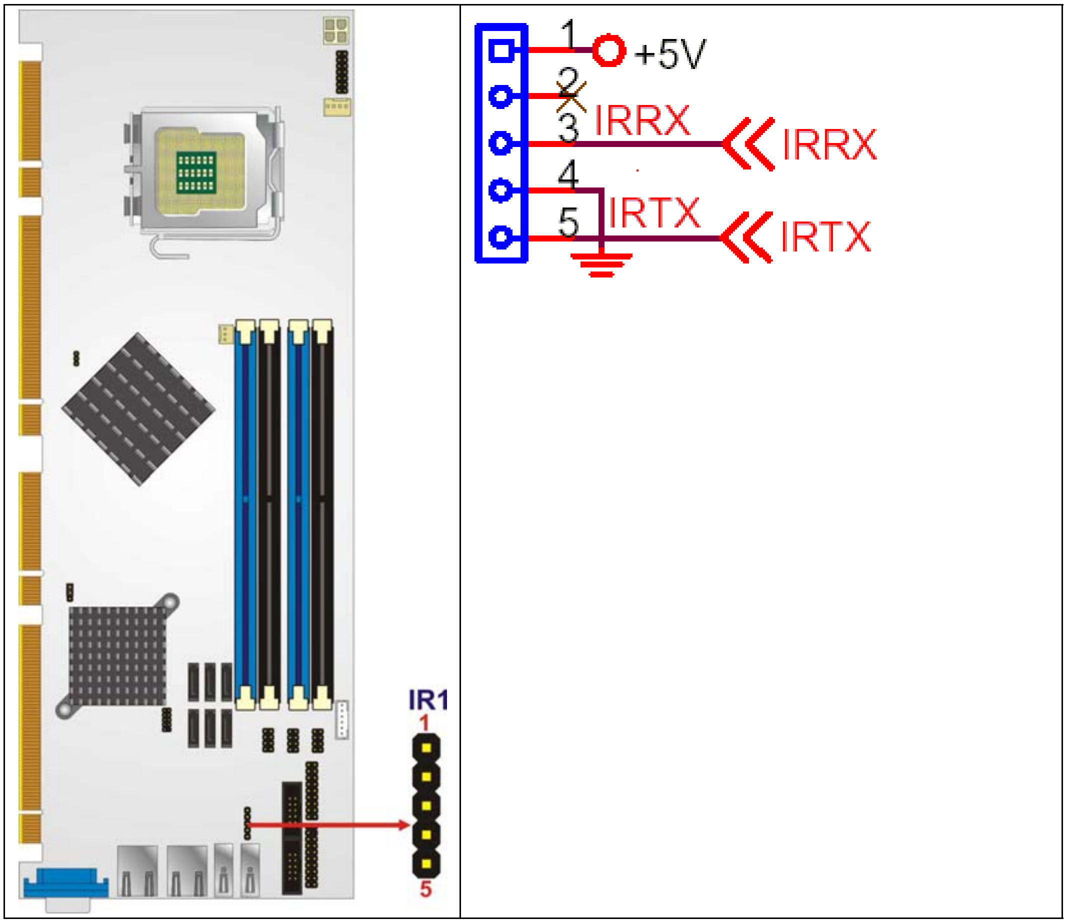


Figure 4-8: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 4-9: Infrared Connector Pinouts

4.2.8 Keyboard/Mouse Connector

CN Label: CN22

CN Type: 6-pin header (1x6)

CN Location: See Figure 4-9

CN Pinouts: See Table 4-10

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

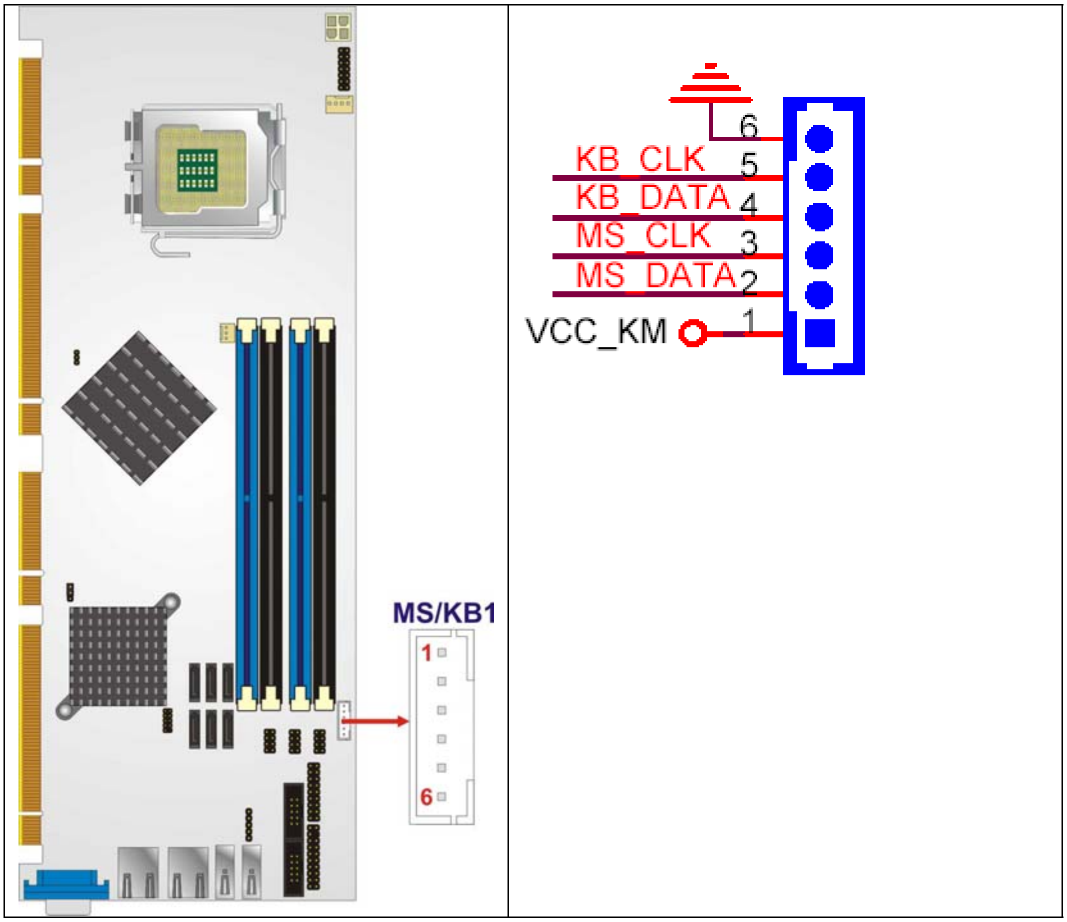


Figure 4-9: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V KB DATA
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 4-10: Keyboard/Mouse Connector Pinouts

4.2.9 SATA Drive Connectors

CN Label: SATA1, SATA2, SATA3, SATA4, SATA5. and SATA6

CN Type: 7-pin SATA drive connectors

CN Location: See Figure 4-10

CN Pinouts: See Table 4-11

The six SATA drive connectors are each connected to second generation SATA drives. Second generation SATA drives transfer data at speeds as high as 300 Mbps. The SATA drives can be configured in a RAID configuration.

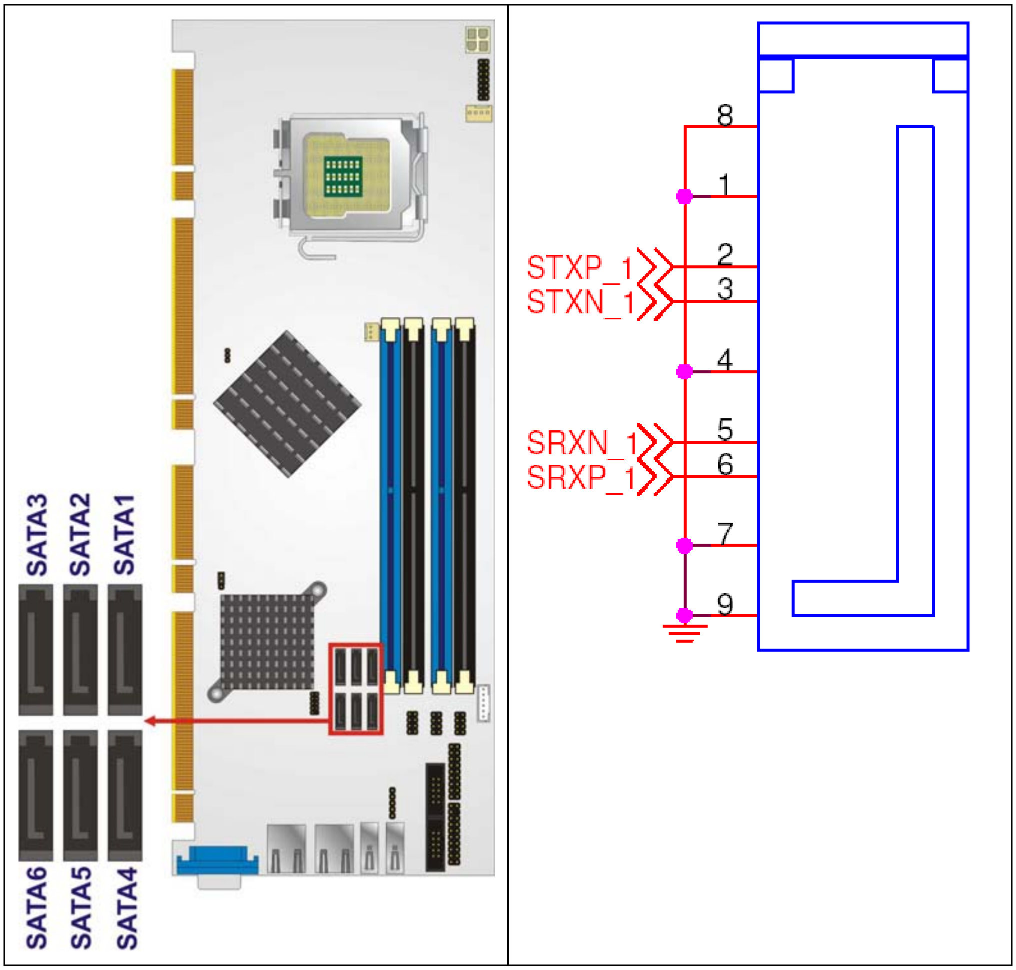


Figure 4-10: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 4-11: SATA Drive Connector Pinouts

4.2.10 Serial Port Connector (COM1, COM 2)

CN Label: COM1 and COM2

CN Type: 10-pin header (2x5)

CN Location: See Figure 4-11

CN Pinouts: See Table 4-12

The 10-pin serial port connector provides a second RS-232 serial communications channel. The COM 2 serial port connector can be connected to external RS-232 serial port devices.

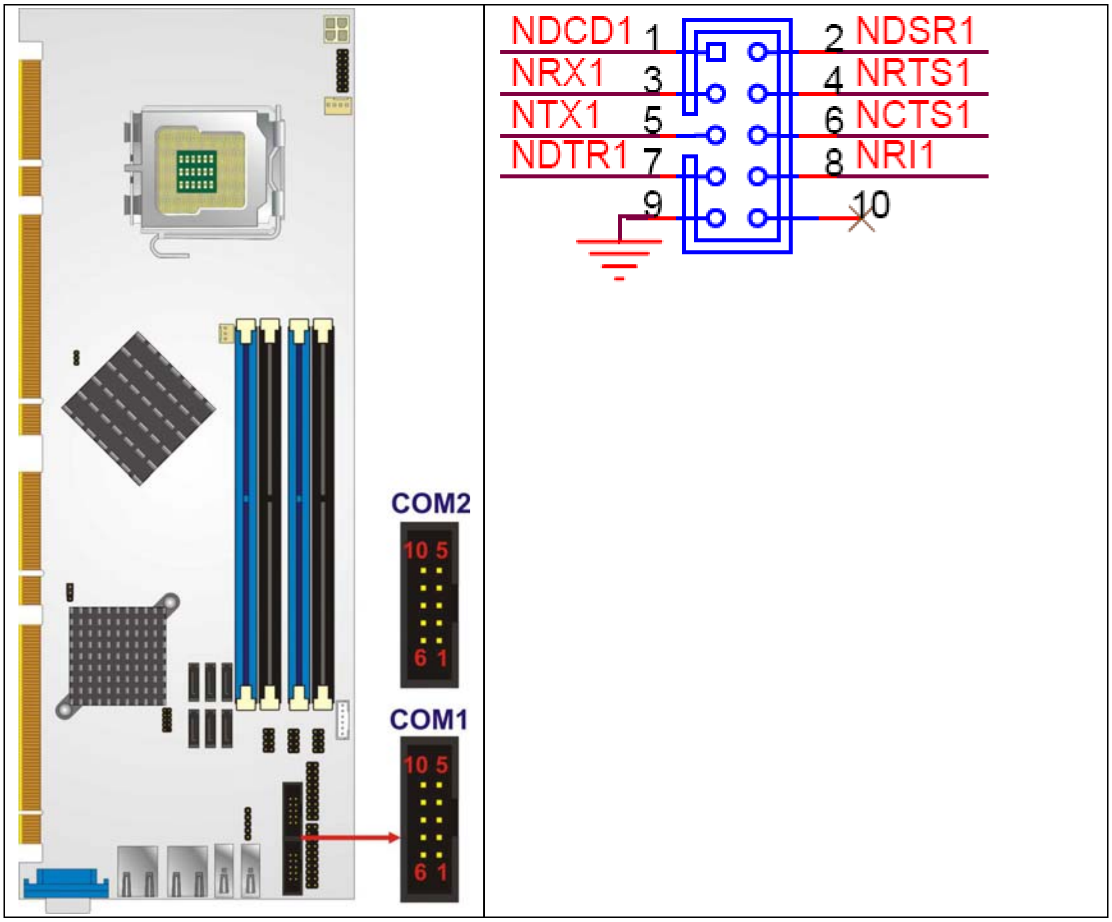


Figure 4-11: Serial Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C

Table 4-12: Serial Connector Pinouts

4.2.11 Trusted Platform Module (TPM) Connector

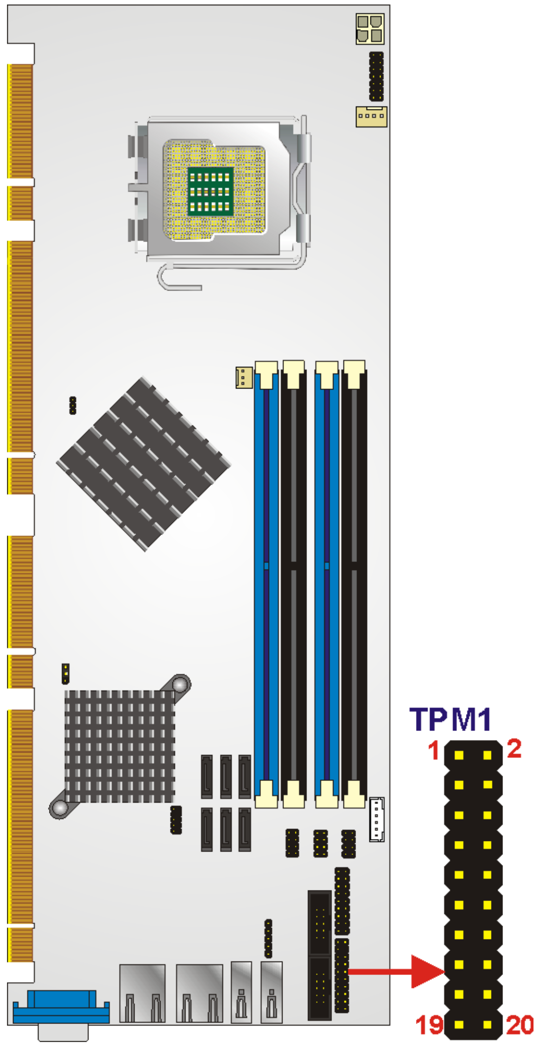
CN Label: TPM1

CN Type: 40-pin header (2x20)

CN Location: See Figure 4-13

CN Pinouts: See Table 4-14

The Trusted Platform Module (TPM) connector secures the system on bootup. An optional TPM (see packing list in **Chapter 3**) can be connected to the TPM connector.



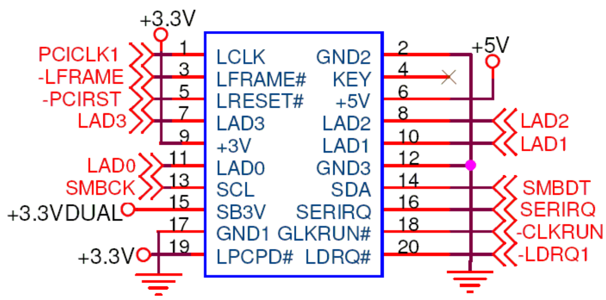


Figure 4-12: TPM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND2
3	LFRAME#	4	KEY
5	LRESET#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND3
13	SCL	14	SDA
15	SB3V	16	SERIRQ

17	GND1	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 4-13: TPM Connector Pinouts

4.2.12 SDVO Control Connector

CN Label: SDVO1

CN Type: 3-pin header (1x3)

CN Location: See Figure 4-13

CN Pinouts: See Table 4-14

If an SDVO graphics card is installed on the PCIe x16 expansion slot on the backplane, the 1x3 pin Serial Digital Video Output (SDVO) control connector must be connected to a corresponding SDVO control connector on a compatible IEI backplane.

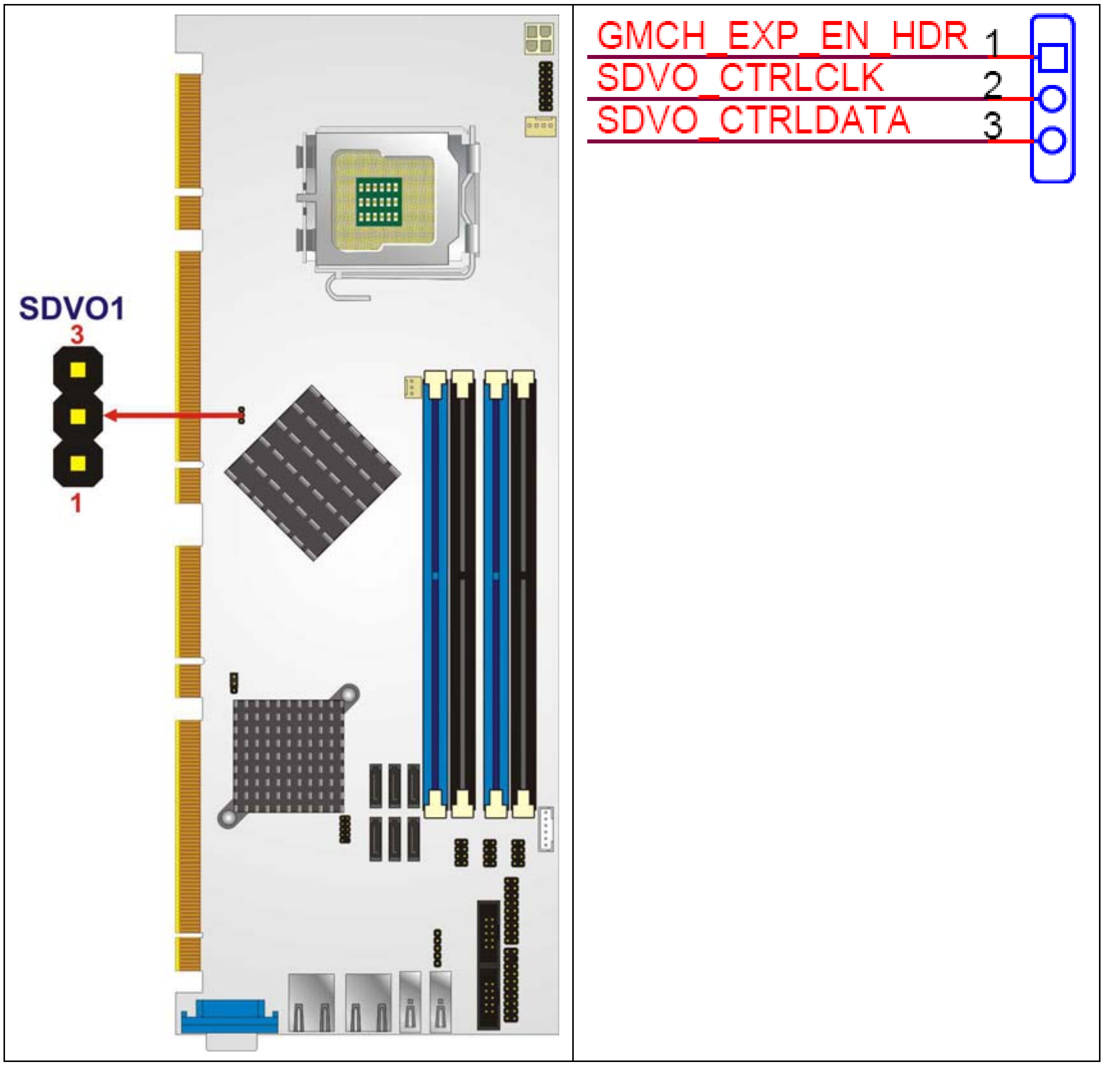


Figure 4-13:SDVO Connector Pinout Locations

PIN NO.	DESCRIPTION
1	EXP_EN
2	SDVO_CLOCK
3	SDVO_DATA

Table 4-14: SDVO Connector Pinouts

4.2.13 USB Connectors (Internal)

CN Label: USB1, USB2 and USB3

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-14

CN Pinouts: See Table 4-15

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices.. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

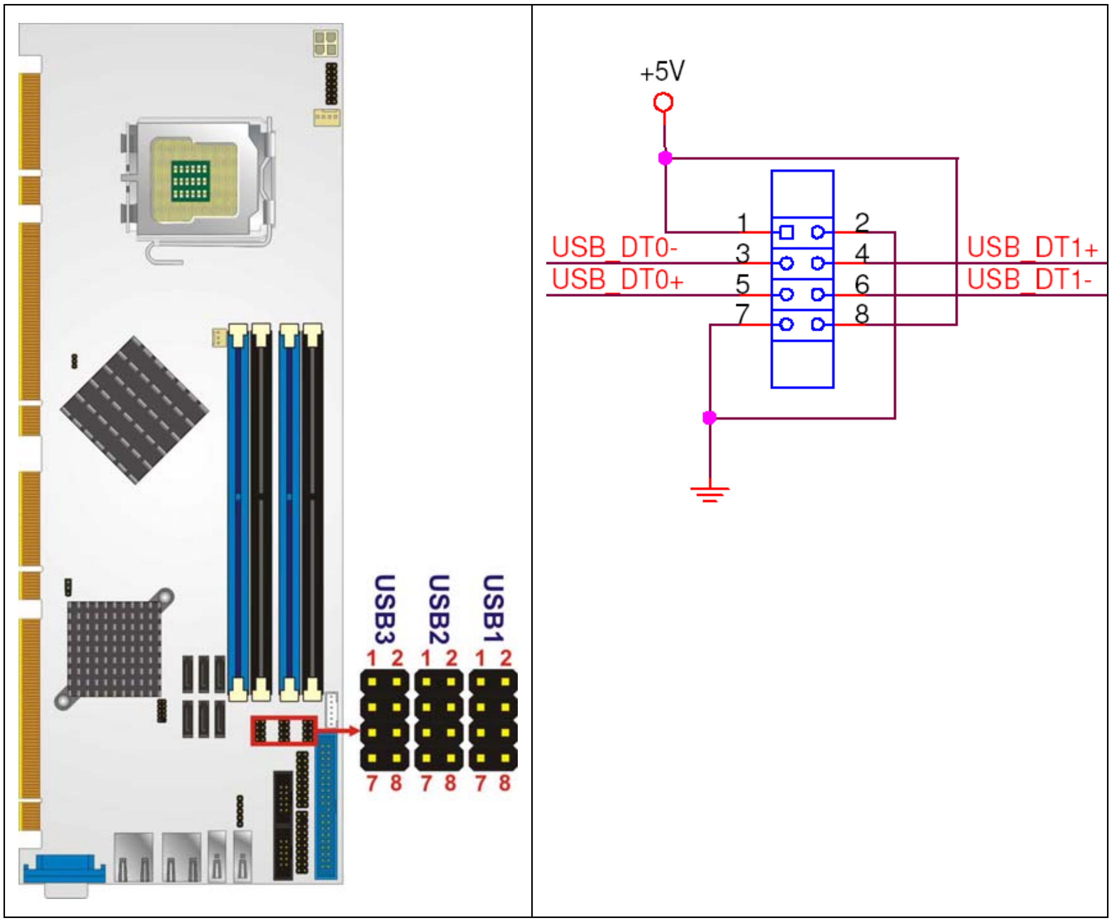


Figure 4-14: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATAN-	4	DATAM+
5	DATAN+	6	DATAM-
7	GND	8	VCC

Table 4-15: USB Port Connector Pinouts

4.3 External Peripheral Interface Connector Panel

Figure 4-15 shows the PCIE-Q350 external peripheral interface connector (EPIC) panel. The PCIE-Q350 EPIC panel consists of the following:

- 1 x DVI connector
- 1 x PS/2 connector
- 2 x RJ-45 LAN connectors

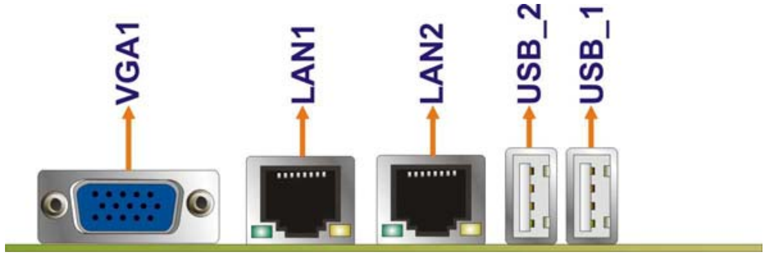


Figure 4-15: PCIE-Q350 External Peripheral Interface Connector

4.3.1 LAN Connectors

CN Label: LAN1 and LAN2

CN Type: RJ-45

CN Location: See Figure 4-15

CN Pinouts: See Table 4-16

The PCIE-Q350 is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the

connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXA+	5	TXC-
2	TXA-	6	TXB-
3	TXB+	7	TXD+
4	TXC+	8	TXD-

Table 4-16: LAN Pinouts

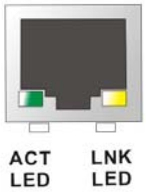


Figure 4-16: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-17**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
ORANGE	10/100 LAN	YELLOW	Linked
GREEN	GbE LAN		

Table 4-17: RJ-45 Ethernet Connector LEDs

4.3.2 USB Connector

CN Label: USB_1 and USB_2

CN Type: USB port

CN Location: See Figure 4-15

CN Pinouts: See Table 4-18

The PCIE-Q350 has four external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	GND
2	USB_P
4	USB_N
4	USB_5V

Table 4-18: USB Port Pinouts

4.3.3 VGA Connector

CN Label: VGA1

CN Type: 15-pin Female

CN Location: See Figure 4-15

CN Pinouts: See Figure 4-17 and Table 4-19

The PCIE-Q350 has a single 15-pin female connector for connectivity to standard display devices.

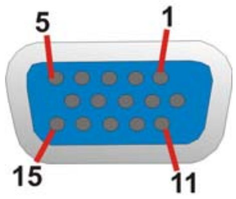


Figure 4-17: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC

PIN	DESCRIPTION	PIN	DESCRIPTION
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 4-19: VGA Connector Pinouts

Chapter 5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the PCIE-Q350 may result in permanent damage to the PCIE-Q350 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PCIE-Q350. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PCIE-Q350, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the PCIE-Q350, place it on an antic-static pad. This reduces the possibility of ESD damaging the PCIE-Q350.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the PCIE-Q350 is installed. All installation notices pertaining to the installation of the PCIE-Q350 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the PCIE-Q350 and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the PCIE-Q350, PCIE-Q350 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the PCIE-Q350 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the PCIE-Q350 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the PCIE-Q350 off:

- When working with the PCIE-Q350, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the PCIE-Q350 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the PCIE-Q350 is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The PCIE-Q350 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - SATA drives
  - Keyboard and mouse cable
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
  - SDVO cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - USB devices

- LAN

5.3 Unpacking

5.3.1 Unpacking Precautions

When the PCIE-Q350 is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 5.1.
- Make sure the packing box is facing upwards so the PCIE-Q350 does not fall out of the box.
- Make sure all the components in the checklist shown in **Chapter 3** are present.

NOTE:

If some of the components listed in the checklist in **Chapter 3** are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PCIE-Q350 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

5.4 CPU, CPU Cooling Kit and DIMM Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, PCIE-Q350 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the PCIE-Q350. If one of these components is not installed the PCIE-Q350 cannot run.

5.4.1 Socket LGA775 CPU Installation

NOTE:

Enabling Hyper-Threading Technology on your system requires meeting all of the platform requirements listed below:

- **CPU**: An Intel® Pentium 4 Processor with HT Technology must be installed
- **Chipset**: An Intel® Chipset that supports HT Technology (that has been met by the PCIE-Q350)
- **OS**: An operating system that has optimizations for HT Technology

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

The LGA775 socket is shown in Figure 5-1.

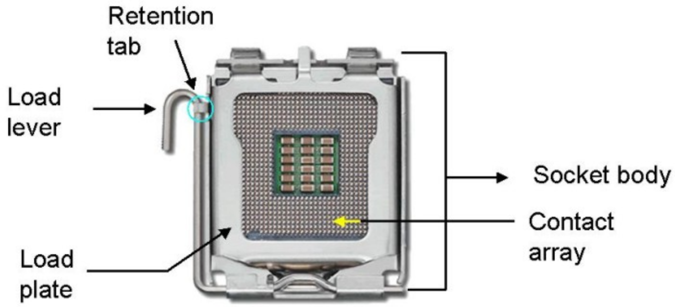


Figure 5-1: Intel® LGA775 Socket

To install a socket LGA775 CPU onto the PCIE-Q350, follow the steps below:

WARNING:

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

Step 1: **Remove the protective cover.** Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the "**REMOVE**" sign and use your fingernail to pry the protective cover off. See **Figure 5-2**.

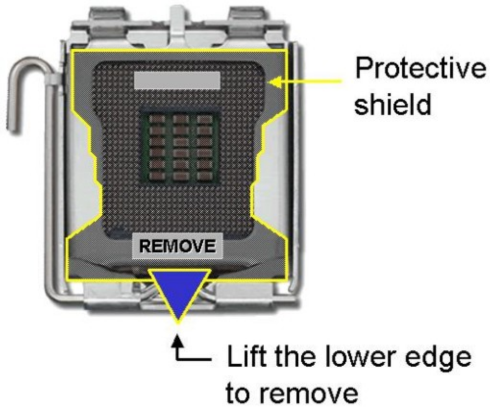


Figure 5-2: Remove the CPU Socket Protective Shield

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open

position. Then rotate the load plate towards the opposite direction.

See **Figure 5-3**.

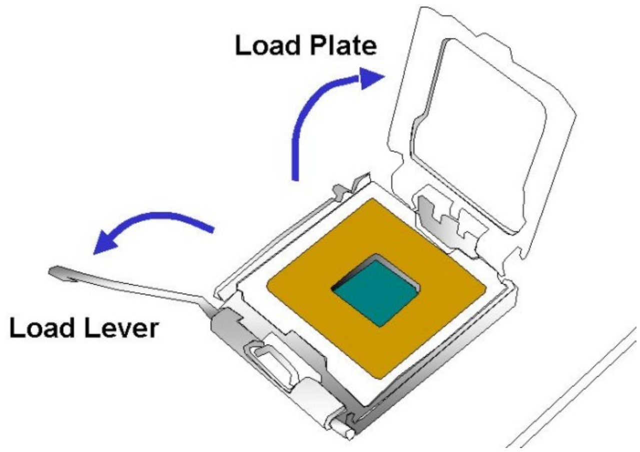


Figure 5-3: Open the CPU Socket Load Plate

Step 3: **Inspect the CPU socket** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly**. Make sure the IHS (Integrated Heat Sink) side is facing upward.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly.

See **Figure 5-4**.

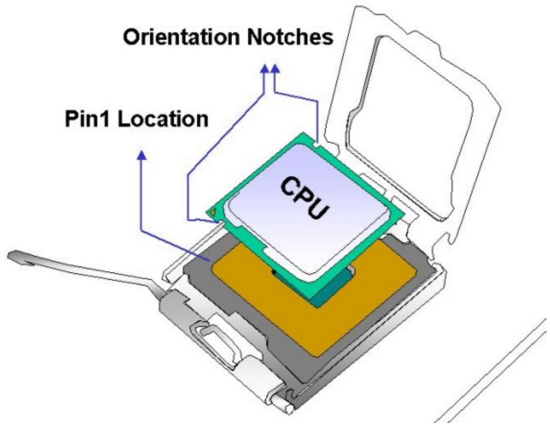


Figure 5-4: Insert the Socket LGA775 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

Step 9: **Connect the CPU 12V cable to the 12After the cooling kit is installed** connect the CPU cable to the CPU 12V power connector.

5.4.2 Socket LGA775 CF-520 Cooling Kit Installation

WARNING:

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel® on the PCIE-Q350.

IEI's cooling kit (CF-520) includes a support bracket that is combined with the heat sink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.



Figure 5-5: IEI CF-520 Cooling Kit

An IEI Socket LGA775 CPU cooling kit shown in **Figure 5-5** can be purchased separately. The cooling kit comprises a CPU heat sink and a cooling fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the [Fan model#] heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit follow the instructions below.

Step 1: **Place the cooling kit onto the socket LGA775 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

Step 4: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB

holes. (See **Figure 5-6**)

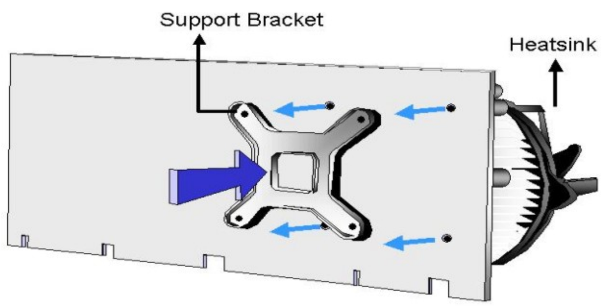


Figure 5-6: Securing the Heat sink to the PCB Board

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the PCIE-Q350. Carefully route the cable and avoid heat generating chips and fan blades.

5.4.3 DIMM Installation

WARNING:

Using incorrectly specified DIMM may cause permanently damage the PCIE-Q350. Please make sure the purchased DIMM complies with the memory specifications of the PCIE-Q350. DIMM specifications compliant with the PCIE-Q350 are listed in **Chapter 2**.

5.4.3.1 DIMM Purchasing Guidelines

WARNING:

Only use DDR2 DIMMs. If DDR DIMMs are used the system may be irreparably damaged.

When purchasing the DDR2 DIMM, please follow the guidelines below:

- ONLY purchase DDR2 DIMM
- Have a frequency of 667 MHz or 800 MHz
- Have a maximum capacity of 2.0 GB
- If more than one DDR2 DIMM is being installed in the system, please purchase DIMM that have the same capacity and operating frequency.

5.4.3.2 DIMM Installation Order

There are two 64-bit wide DDR2 channels on the Intel® Q35 Northbridge, Channel A and Channel B. DDR2 Channel A and DDR2 Channel B are shown in **Figure 5-7** below.

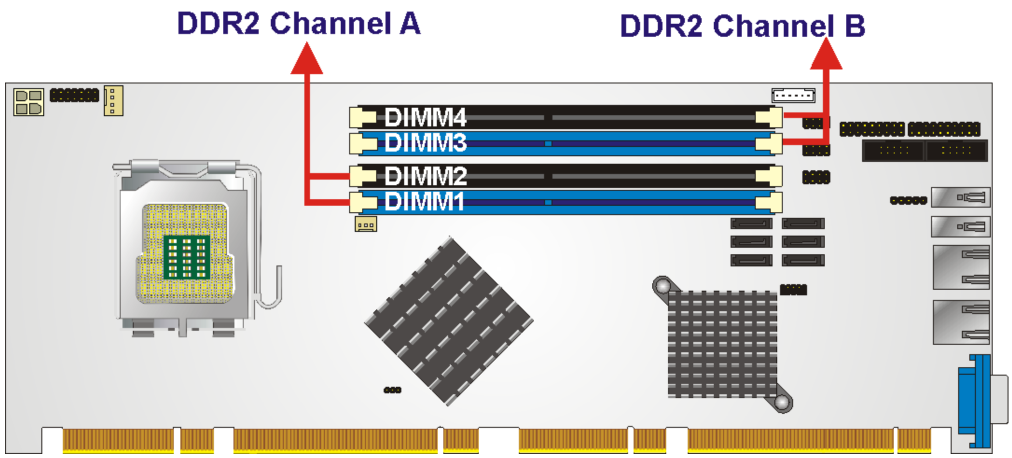


Figure 5-7: DDR2 Channels

On the PCIE-Q350, each channel is interfaced to two 240-pin DIMM sockets in the following order (see **Figure 5-7** above):

- **Channel A**: DIMM1 and DIMM2
- **Channel B**: DIMM3 and DIMM4

When populating the DDR2 DIMM sockets, populate them in the following order to optimize the memory performance:

Step 1: **DIMM1**. Install the first DDR2 DIMM into the DIMM1 DDR2 DIMM socket.

Step 2: **DIMM3**. Install the second DDR2 DIMM into the DIMM3 DDR2 DIMM socket.

Step 3: **DIMM2**. Install the third DDR2 DIMM into the DIMM2 DDR2 DIMM socket.

Step 4: **DIMM4**. Install the fourth DDR2 DIMM into the DIMM4 DDR2 DIMM socket.

5.4.3.3 DIMM Installation Guidelines

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-8**.

Step 1: **Open the DIMM socket handles**. The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 5-8**.

Step 2: **Align the DIMM with the socket**. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-8**.

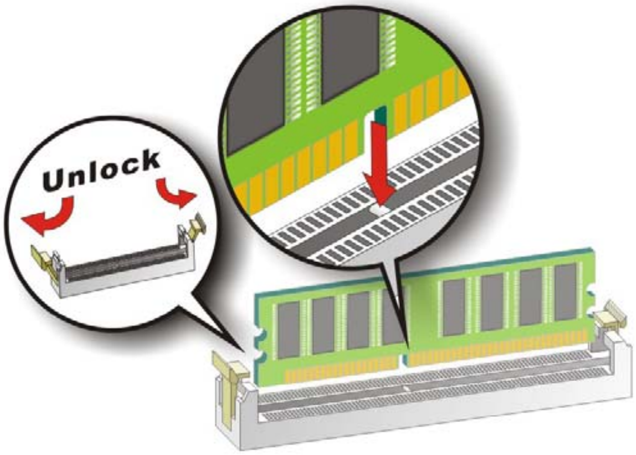


Figure 5-8: Installing a DIMM

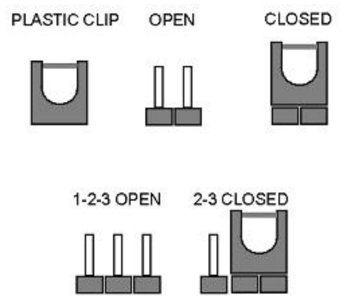
Step 3: **Insert the DIMM**. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-8**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Jumper

Before the PCIE-Q350 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the PCIE-Q350 are listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header

Table 5-1: Jumpers

5.5.1 Clear CMOS Jumper

Jumper Label: J_CMOS1

Jumper Type: 3-pin header

Jumper Settings: See Table 5-2

Jumper Location: See Figure 5-9

If the PCIE-Q350 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu. The clear CMOS jumper settings are shown in **Table 5-2**.

Jumper Select	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-2: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-9** below.

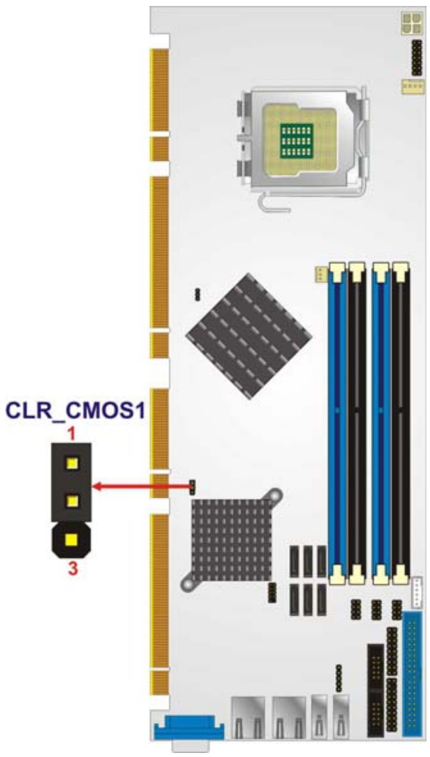


Figure 5-9: Clear CMOS Jumper

5.6 Chassis Installation

5.6.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the PCIE-Q350 must have air vents to allow cool air to move into the system and hot air to move out.

The PCIE-Q350 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

NOTE:

IEI has a wide range of backplanes available. Please contact your PCIE-Q350 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.6.2 Backplane Installation

Before the PCIE-Q350 can be installed into the chassis, a backplane must first be installed. Please refer to the installation instructions that came with the backplane and the chassis to see how to install the backplane into the chassis.

NOTE:

IEI has a wide range of backplanes available. Please contact your PCIE-Q350 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.6.3 CPU Card Installation

To install the PCIE-Q350 CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding socket on the backplane. See **Figure 5-10**.

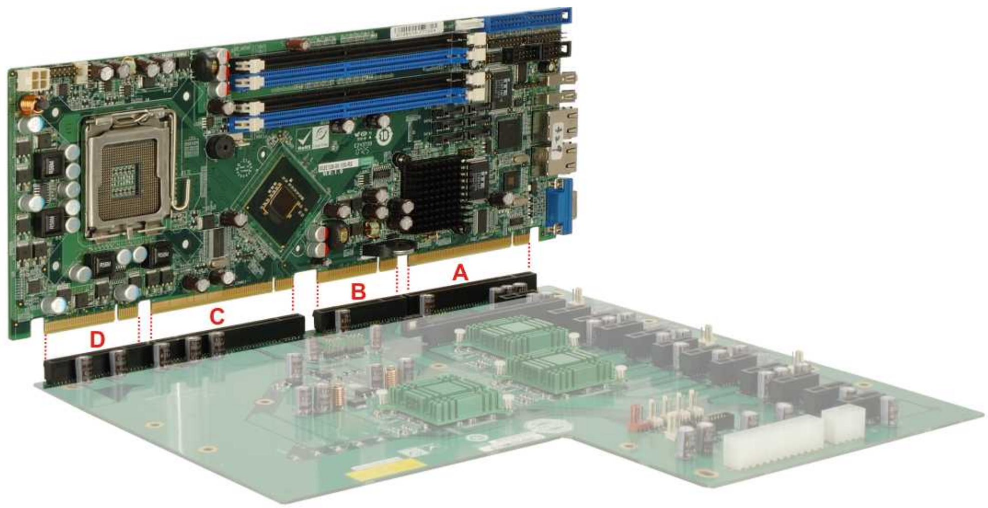


Figure 5-10: PCIE-Q350 Backplane Installation

Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-3** are shipped with the PCIE-Q350.

Quantity	Type
1	Dual RS-232 cable
1	KB/MS cable with mini DIN
1	PS/2 Y-cable
6	SATA drive cables
3	SATA drive power cables
1	USB cable

Table 5-3: IEI Provided Cables

Separately purchased optional IEI items that can be installed are listed below:

- Audio kit
- TPM Module

For more details about the items listed above, please refer to **Chapter 3**. Installation of the accessories listed above are described in detail below.

5.7.2 Audio Kit Installation

An optional audio kit that is separately ordered connects to the 9-pin audio connector on the PCIE-Q350. The audio kit consists of five audio jacks. One audio jack, Mic In, connects to a microphone. The remaining four audio jacks, Front-In, Front-Out, Rear-Out and subwoofer connect to four speakers including a subwoofer. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the onboard connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-11**.

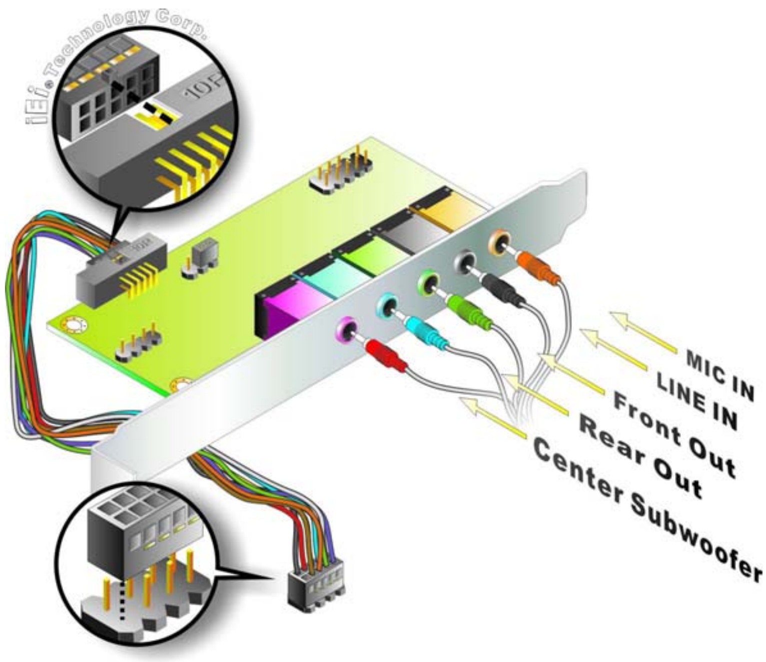


Figure 5-11: Audio Kit Connection

Step 3: **Connect the audio devices**. Connect the speakers and the subwoofer to the appropriate audio jack shown in **Figure 5-11**.

5.7.3 Dual RS-232 Cable Connection

The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the dual RS-232 cable, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connectors.** Insert one connector into each serial port box headers. See **Figure 5-12**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

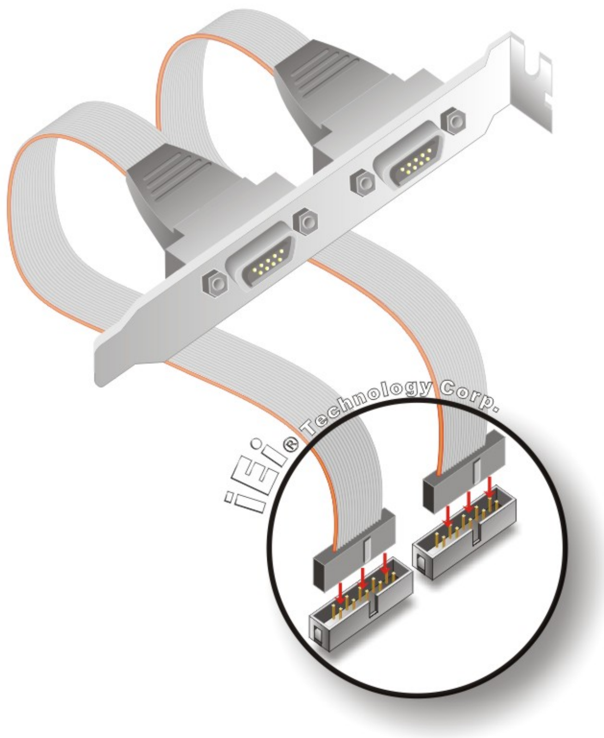


Figure 5-12: Dual RS-232 Cable Installation

Step 3: **Secure the bracket**. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

5.7.4 SATA Drive Connection

The PCIE-Q350 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-13**.

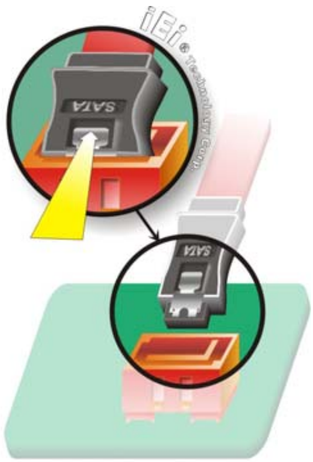


Figure 5-13: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-14**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-14**.



Figure 5-14: SATA Power Drive Connection

5.7.5 USB Cable (Dual Port)

The PCIE-Q350 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors.** The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the PCIE-Q350 USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the PCIE-Q350, connect the cable connectors to the onboard connectors. See **Figure 5-15**.

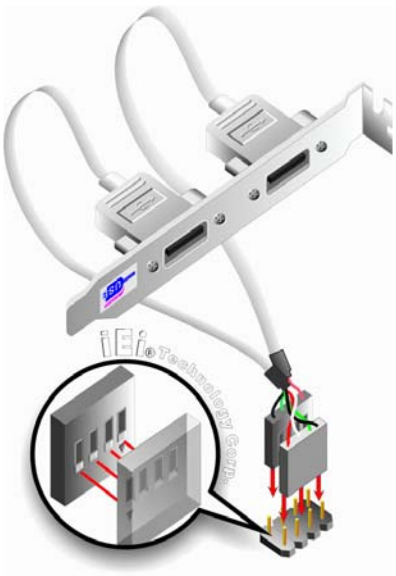


Figure 5-15: Dual USB Cable Connection

Step 4: **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

5.8 Installing Devices on a PICMG 1.3 Backplane

Compatible PICMG 1.3 backplanes can accommodate the following devices:

- PCIe x16 graphics cards
- SDVO device graphics card
- PCIe x4 expansion cards
- PCIe x1 expansion cards
- PCI expansion cards

5.8.1 PCIe x16 Graphics Card Installation

To install a PCIe x16 graphics card onto a backplane, please do the following:

Step 1: Find the PCIe x16 socket on the backplane.

Step 2: Align the edge connectors on the bottom of the PCIe x16 graphics card with the socket. See **Figure 5-16**.

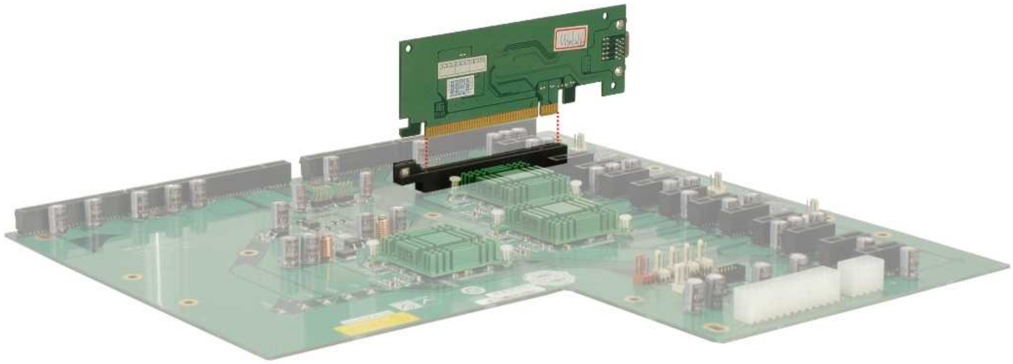


Figure 5-16: PCIe x16 Installation

Step 3: Gently push the PCIe x16 graphics card into the PCIe x16 socket on the backplane.

Step 4: Secure the PCIe x16 to the chassis. To do this please refer to the reference material that came with the chassis.

5.8.2 SDVO Device Installation

To install an SDVO device on the backplane, please follow the steps below:

Step 1: Make sure the PCIE-Q350 is properly installed on the backplane

Step 2: Locate the PCIe x16 graphics card slot

Step 3: Insert the SDVO device into the PCIe x16 graphics card slot

Step 4: Connect the PCIE-Q350 SDVO control connector to the corresponding connector on the backplane.

5.9 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- Keyboard and mouse (first install the keyboard and mouse cable connector)
- USB device cable connectors
- VGA device cable connectors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding PCIE-Q350 external peripheral interface connector making sure the pins are properly aligned.

5.9.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of

the RJ-45 connectors on the PCIE-Q350. See **Figure 5-17**.

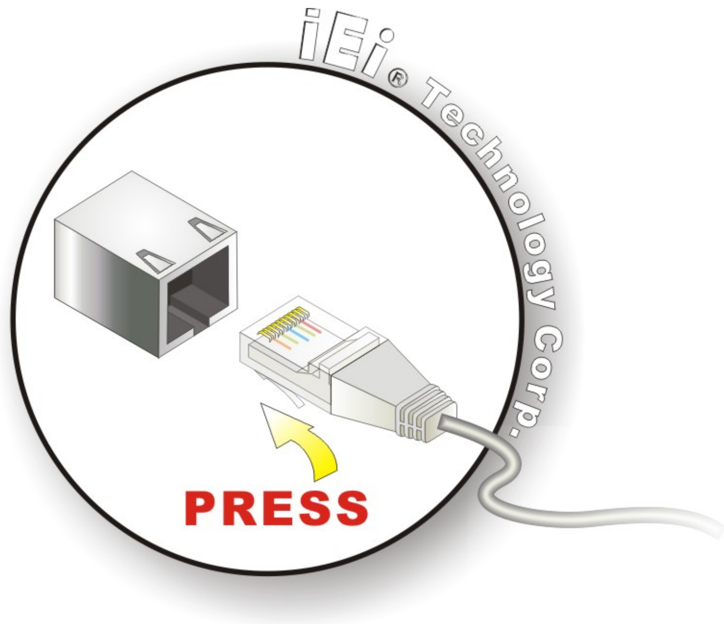


Figure 5-17: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

5.9.2 PS/2 Y-Cable Connection

NOTE:

Before installing the PS/2 Y-cable connector, make sure the keyboard and mouse cable with the mini DIN connector has been properly installed and that the DIN connector is correctly mounted on the external panel.

The PCIE-Q350 has a PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is connected to the PS/2 Y-cable that came with the PCIE-Q350. One of the PS/2 cables is connected to a keyboard and the other to a mouse to the system. Follow the steps below to connect a keyboard and mouse to the PCIE-Q350.

Step 1: **Locate the dual PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See **Figure 5-18**.

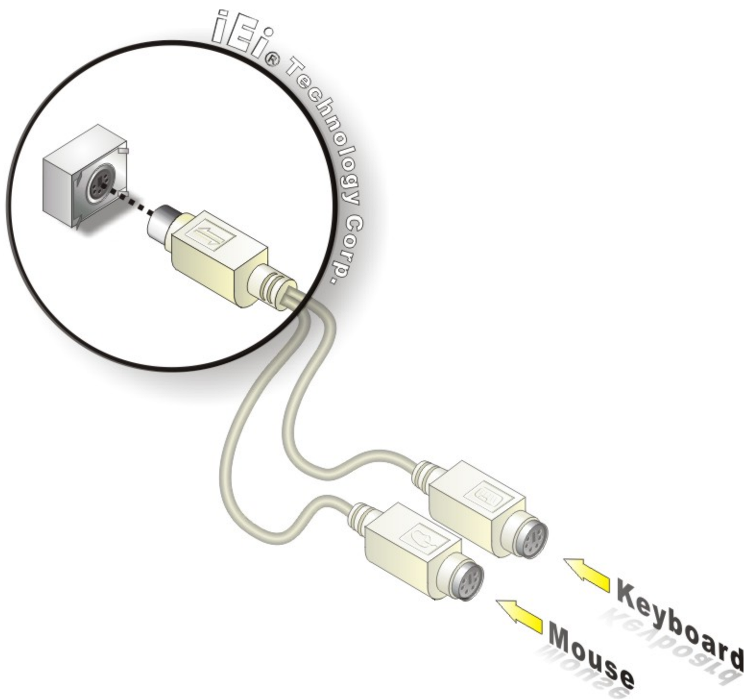


Figure 5-18: PS/2 Keyboard/Mouse Connector

Step 3: **Connect the keyboard and mouse**. Connect the keyboard and mouse to the appropriate connector. The keyboard and mouse connectors can be distinguished from each other by looking at the small graphic at the top of the connector.

5.9.3 USB Device Connection (Single Connector)

There are two external USB 2.0 connectors. Both connectors are perpendicular to the PCIE-Q350. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

Step 1: **Located the USB connectors**. The locations of the USB connectors are shown

in **Chapter 4**.

Step 2: **Align the connectors.** Align the USB device connector with one of the connectors on the PCIE-Q350. See Figure 5-19.

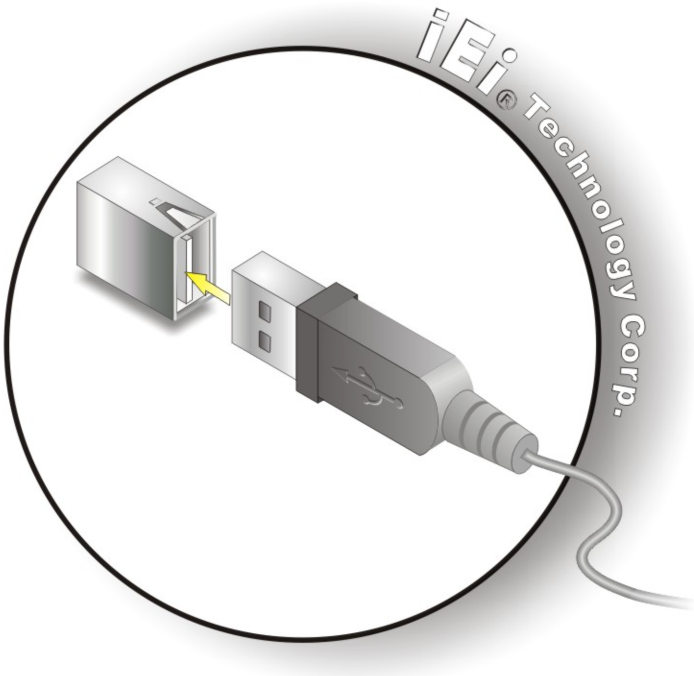


Figure 5-19: USB Device Connection

Step 3: **Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

5.9.4 VGA Monitor Connection

The PCIE-Q350 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the PCIE-Q350, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the PCIE-Q350. See **Figure 5-20**.

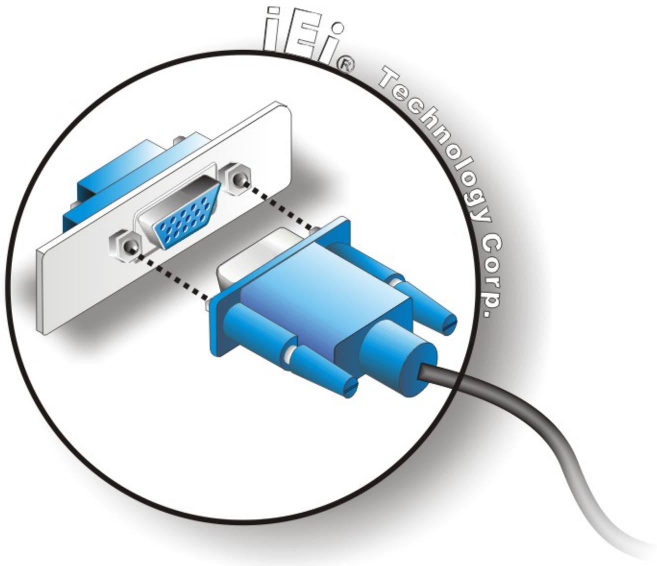


Figure 5-20: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

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Chapter

6

BIOS Screens

6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen. 0.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	**Function**
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5**.

6.1.5 BIOS Menu Bar

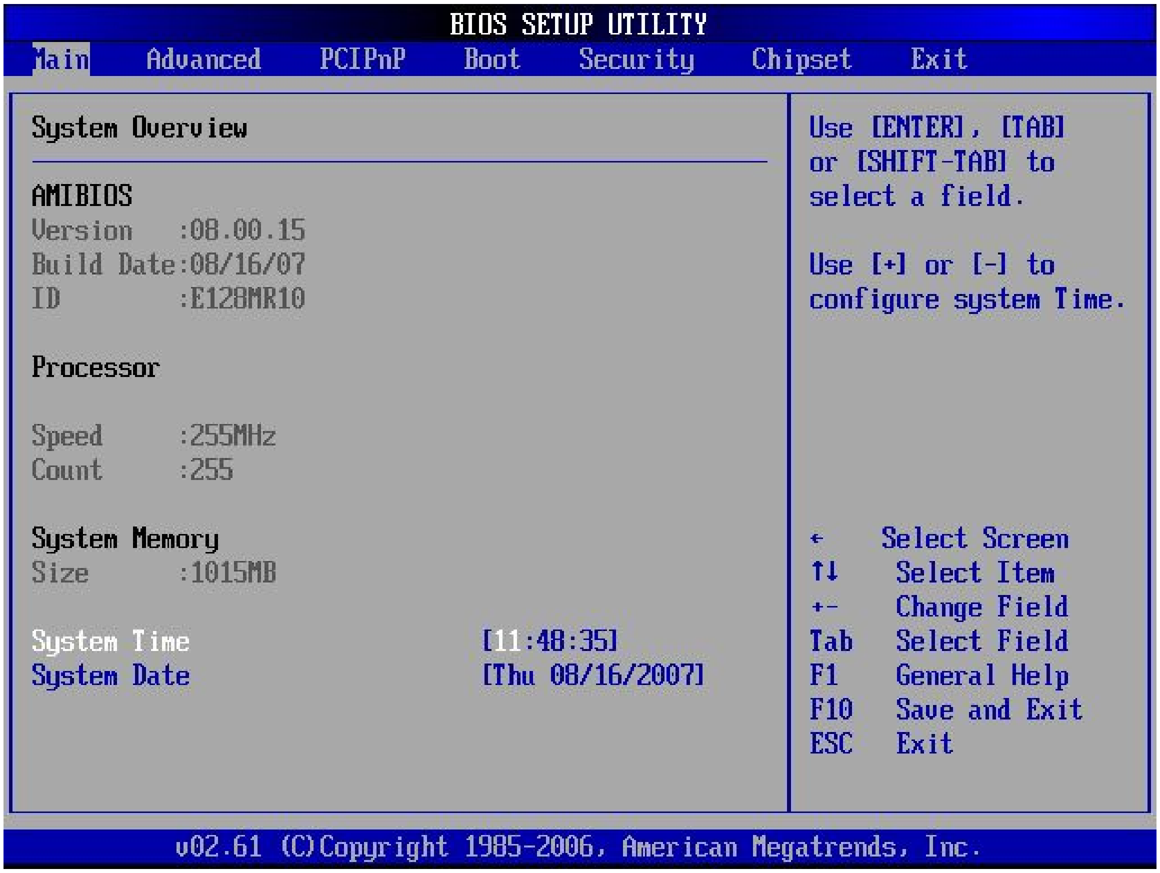
The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

6.2 Main

The Main BIOS menu (BIOS Menu 1) appears when the BIOS Setup program is entered. The Main menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - o **Version**: Current BIOS version
  - o **Build Date**: Date the current BIOS version was made
  - o **ID**: Installed BIOS ID

- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed
  - **Count**: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The System Overview field also has two user configurable fields:

→ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

→ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

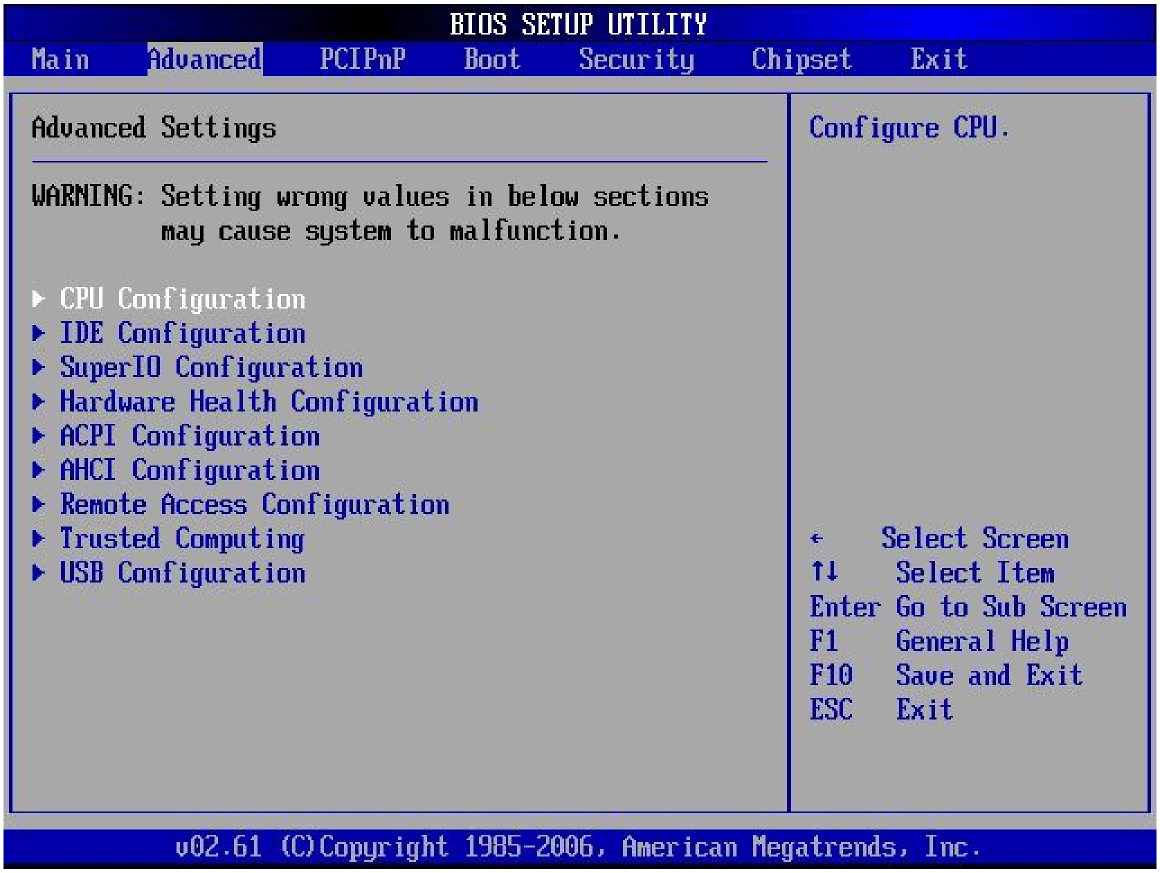
Use the **Advanced** menu to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- **CPU Configuration** (see Section 6.3.1)
- **IDE Configuration** (see Section 6.3.2)
- **Super IO Configuration** (see Section 6.3.3)
- **Hardware Health Configuration** (see Section 6.3.4)
- **ACPI Configuration** (see Section 6.3.5)

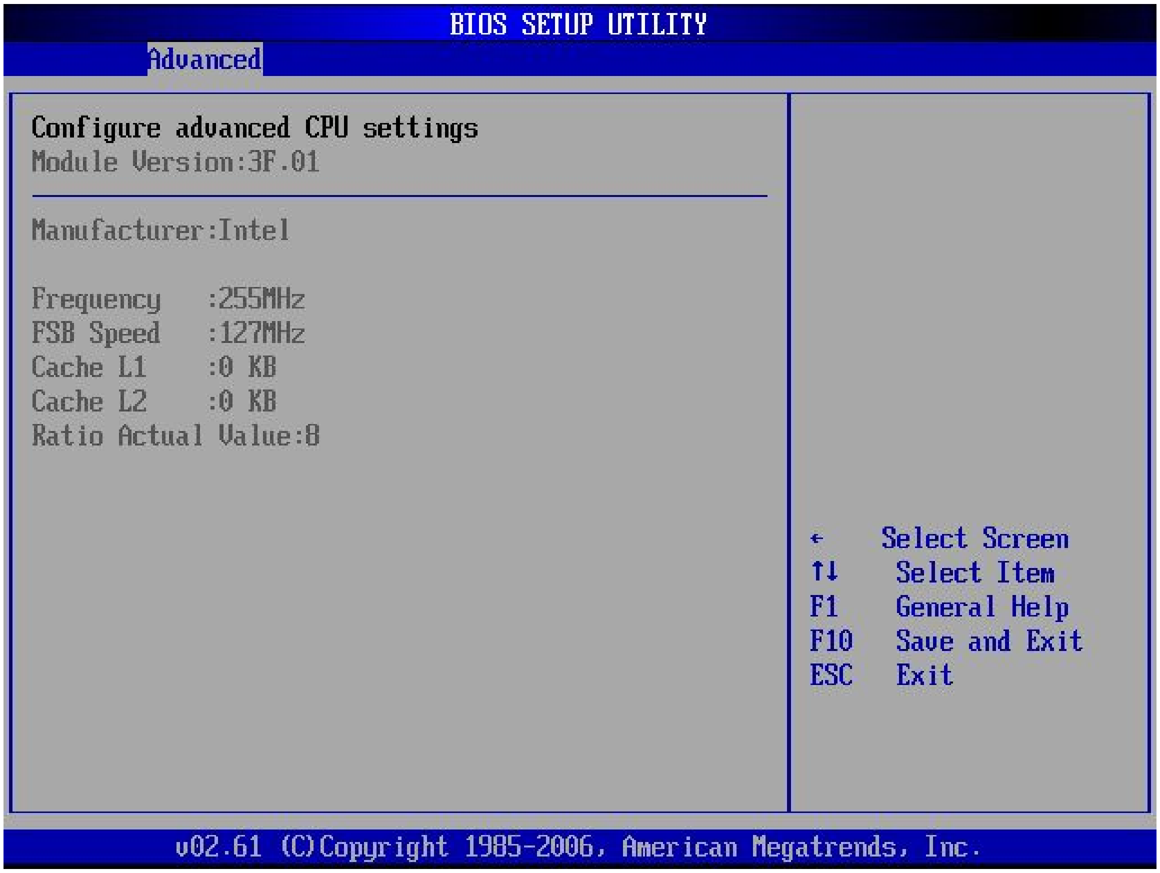
- **ACHI Configuration** (See Section 6.3.5.1)
- **Remote Access Configuration** (see Section 6.3.6)
- **Trusted Computing** (see Section 6.3.5)
- **USB Configuration** (see Section 6.3.7)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the CPU Configuration menu (BIOS Menu 3) to view detailed CPU specifications and configure the CPU.



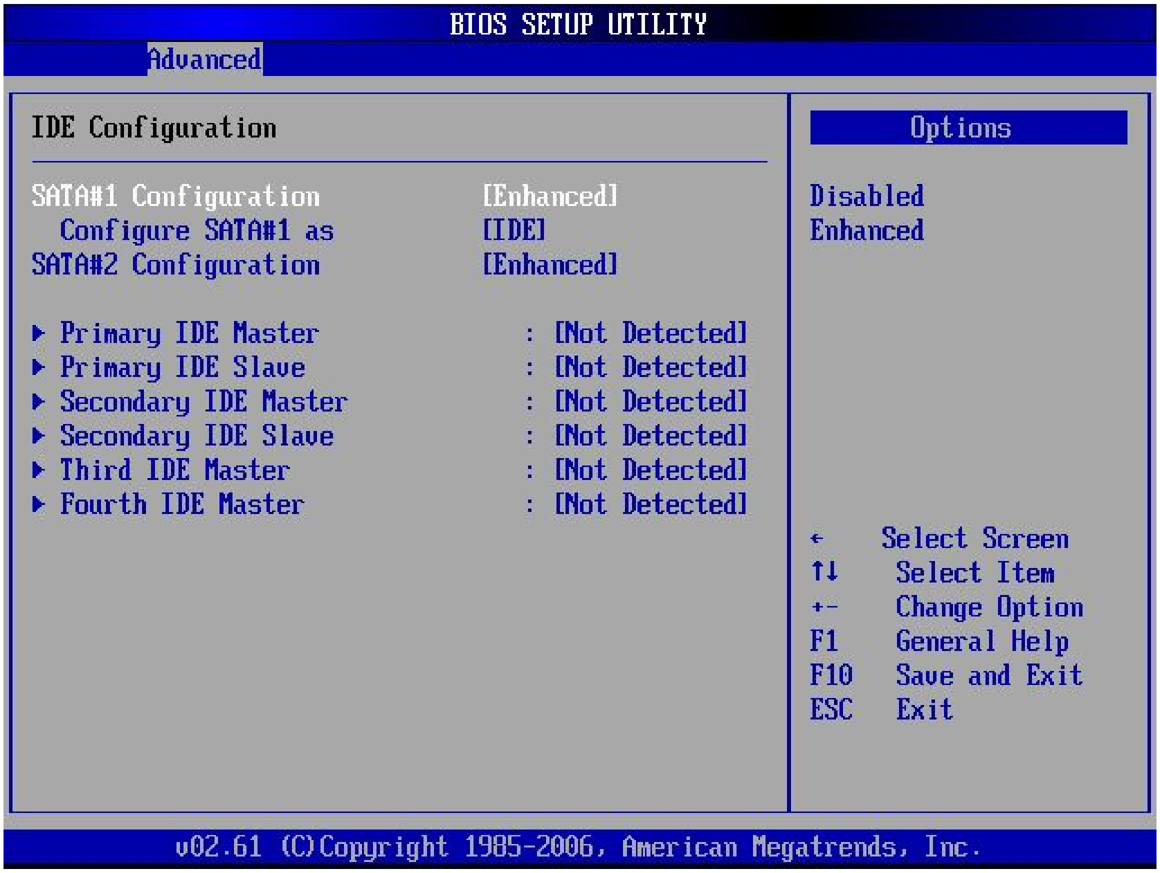
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- **Ratio Actual**: Clock speed ratio

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ SATA#1 Configuration [Enhanced]

Use the **SATA#n** BIOS option to enable the nth SATA drive port.

- ➔ **Enhanced** **DEFAULT** The nth SATA drive port is activated
- ➔ **Disabled** The nth SATA drive port is disabled

➔ Configure SATA#n as [IDE]

Use the **Configure SATA#n as** BIOS option to specify whether the drive connected to the nth SATA port is a standard IDE drive, a standard SATA drive (AHCI mode) or a SATA drive in a RAID configuration mode.

➔ **IDE** **DEFAULT** The drive connected to the nth SATA port is configured as an IDE drive

➔ **RAID** The SATA drive connected to the nth SATA drive port is specified as a SATA drive that is part of a RAID array

➔ **AHCI** The SATA drive connected to the nth SATA drive port is specified as a normal SATA drive.

➔ **IDE Master and IDE Slave**

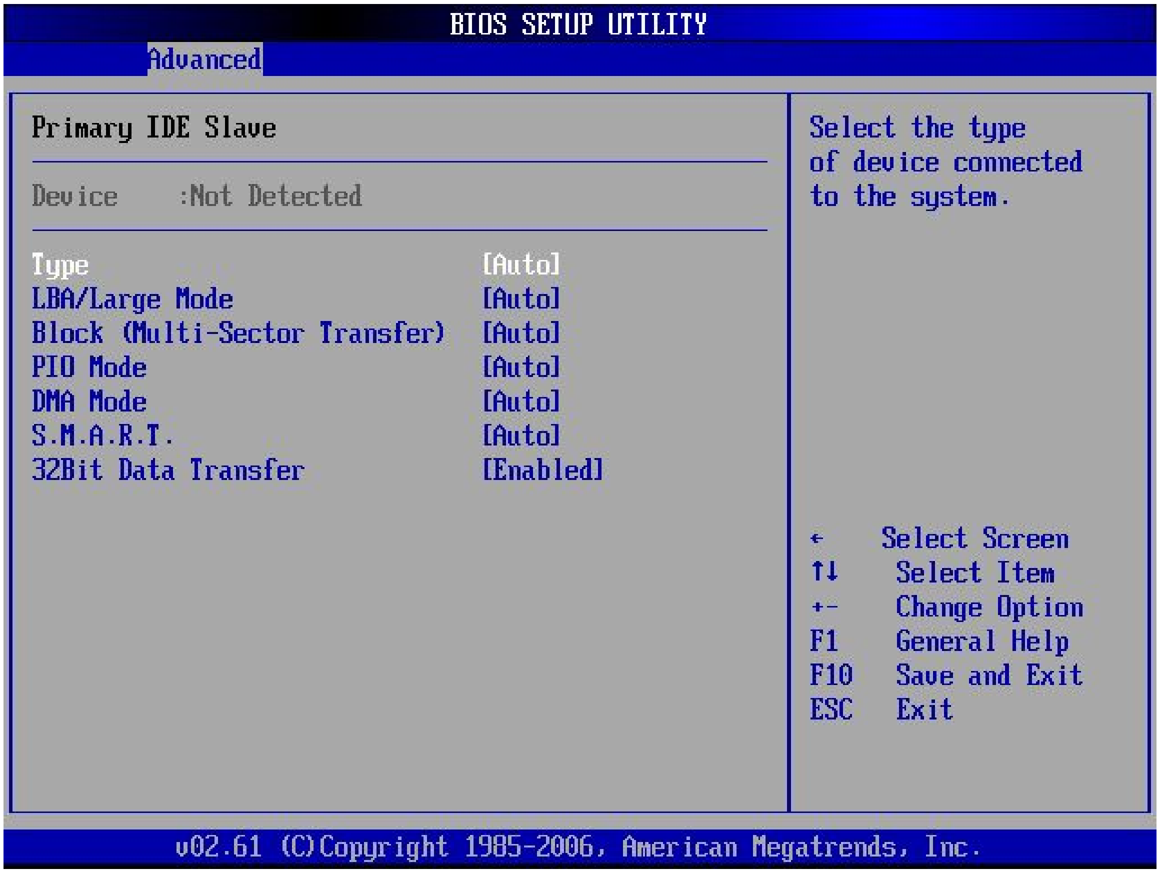
When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ Auto-Detected Drive Parameters

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per

interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ Type [Auto]

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed** — BIOS is prevented from searching for an IDE disk drive on the specified channel.

➔ **Auto** **DEFAULT** — The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD** — The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD** — This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

➔ **ZIP**

➔ **LS-120**

➔ LBA/Large Mode [Auto]

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

- ➔ **Disabled** — BIOS is prevented from using the LBA mode control on the specified channel.
- ➔ **Auto** DEFAULT — BIOS auto detects the LBA mode control on the specified channel.

➔ Block (Multi Sector Transfer) [Auto]

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

- ➔ **Disabled** — BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
- ➔ **Auto** DEFAULT — BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ PIO Mode [Auto]

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

- ➔ **Auto** DEFAULT — BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps
- **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

DMA Mode [Auto]

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

- **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

- ➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- ➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- ➔ **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- ➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ S.M.A.R.T [Auto]

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

- ➔ **Auto** **DEFAULT** BIOS auto detects HDD SMART support.
- ➔ **Disabled** Prevents BIOS from using the HDD SMART feature.
- ➔ **Enabled** Allows BIOS to use the HDD SMART feature

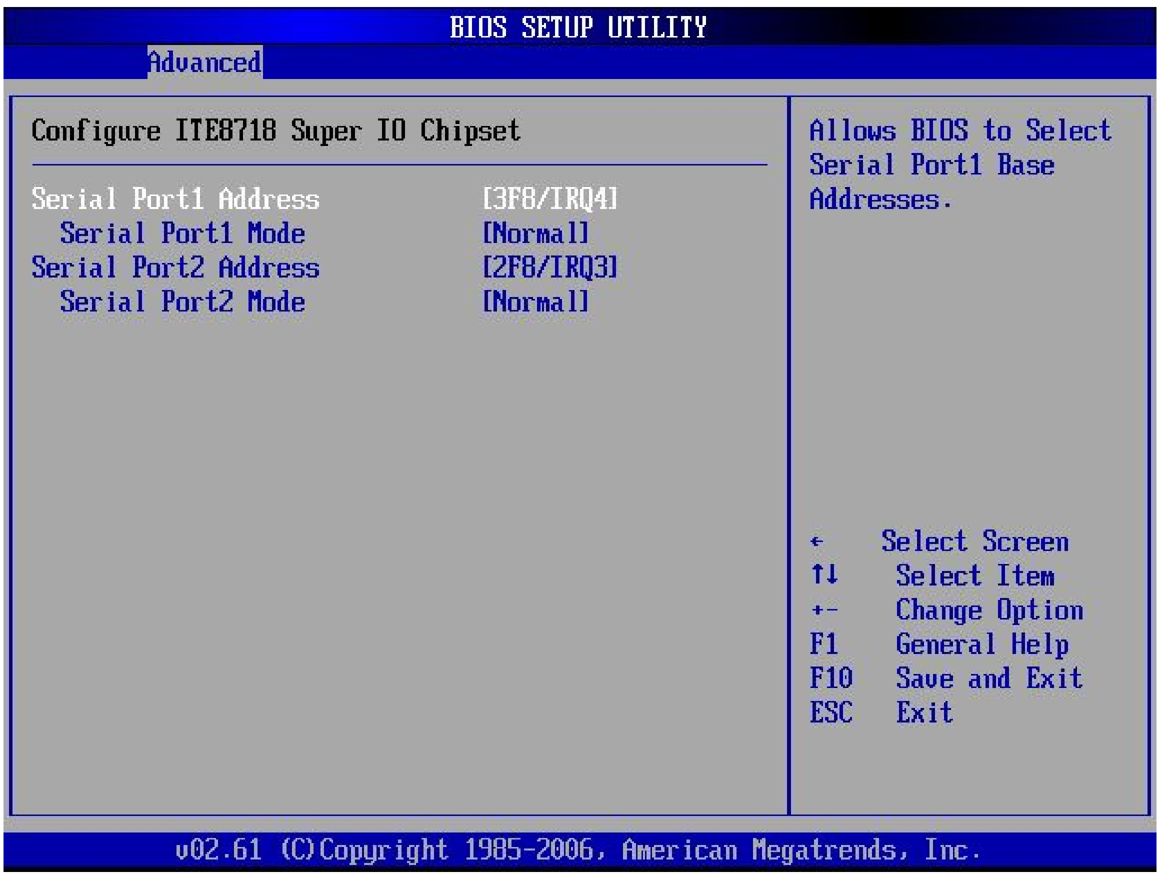
➔ 32Bit Data Transfer [Enabled]

Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

- → **Disabled** Prevents the BIOS from using 32-bit data transfers.
- → **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 6: Super IO Configuration

→ Serial Port1 Address [3F8/IRQ4]

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

→ **Disabled** No base address is assigned to Serial Port 1

→ **3F8/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4

→ **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4

→ **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

→ **Serial Port1 Mode [Normal]**

Use the **Serial Port1 Mode** option to select the transmitting and receiving mode for the first serial port.

→ **Normal** **DEFAULT** Serial Port 1 mode is normal

→ **IrDA** Serial Port 1 mode is IrDA

→ **ASK IR** Serial Port 1 mode is ASK IR

→ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

→ **Disabled** No base address is assigned to Serial Port 2

→ **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

→ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

→ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

→ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

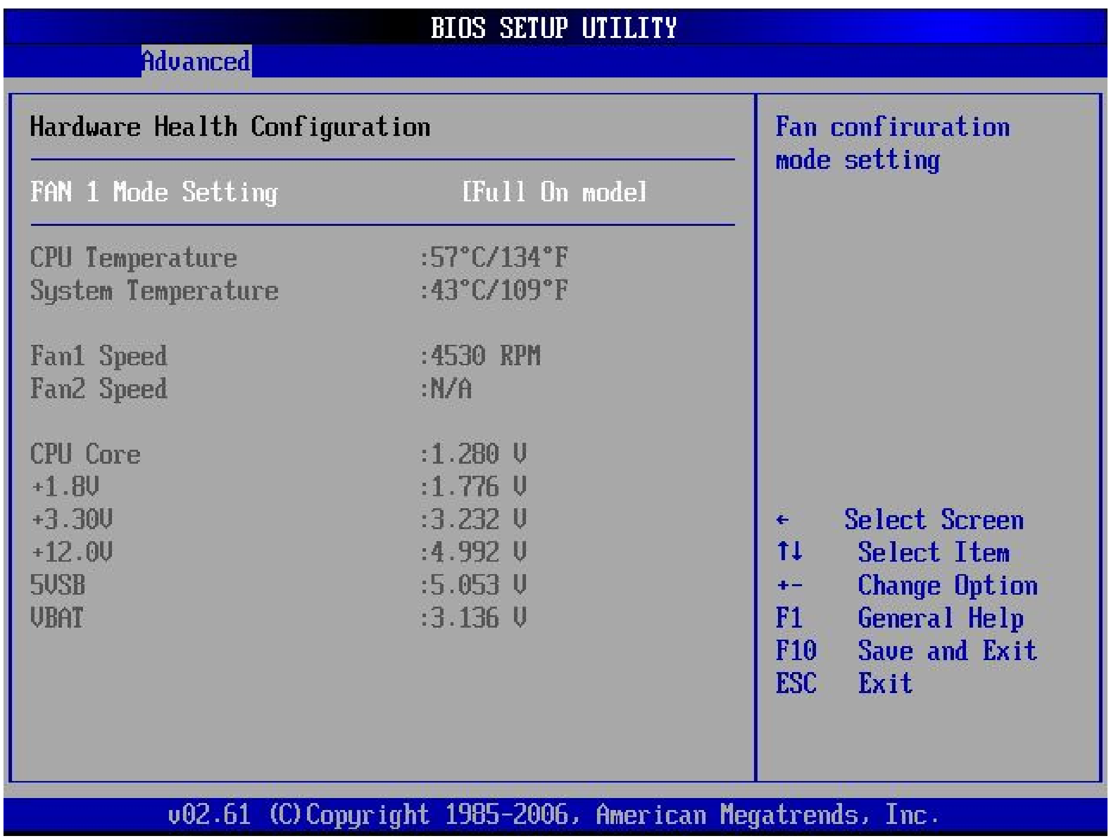
→ **Normal** DEFAULT Serial Port 2 mode is normal

→ **IrDA** Serial Port 2 mode is IrDA

→ **ASK IR** Serial Port 2 mode is ASK IR

6.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 7: Hardware Health Configuration

➔ **CPU FAN 1 Mode Setting [Full On Mode]**

Use the **CPU FAN 1 Mode Setting** option to configure the second fan.

➔ **Full On Mode** **DEFAULT** Fan is on all the time

➔ **Automatic mode** Fan is off when the temperature is low enough. Parameters must be set by the user.

➔ **PWM Manual mode** Pulse width modulation set manually

When the **CPU FAN 1 Mode Setting** option is in the **Automatic Mode**, the following parameters can be set.

- CPU Temp. Limit of OFF
- CPU Temp. Limit of Start
- CPU Temp. Limit of Full
- CPU Fan Start PWM
- Slope PWM 1

When the **CPU FAN Mode Setting** option is in the **PWM Manual Mode**, the following parameters can be set.

- CPU Fan PWM control

➔ **CPU Temp. Limit of OFF [000]**

WARNING:

Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of OFF** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of OFF** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temp. Limit of OFF** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

→ **CPU Temp. Limit of Start [020]**

WARNING:

Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of Start** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Start** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **Fan 3 Start PWM** option below. To select a value, select the **CPU Temp. Limit of Start** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

→ CPU Temp. Limit of Full [080]

WARNING:

Setting this value too high may cause the fan to start rotating at full speed only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of Full** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Full** option to select the CPU temperature at which the cooling fan starts to rotate at full speed. When the CPU temperature exceeds the temperature specified in this option, the fan starts to rotate at full speed. To select a value, select the **CPU Temp. Limit of Full** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

→ CPU Fan Start PWM [070]

The **Fan 3 Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Fan 3 Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **Temperature 3 Limit of Start** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **Fan 3 Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

➔ **Slope PWM 1 [1 PWM]**

The **Slope PWM 1** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM 1** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. A list of available options is shown below:

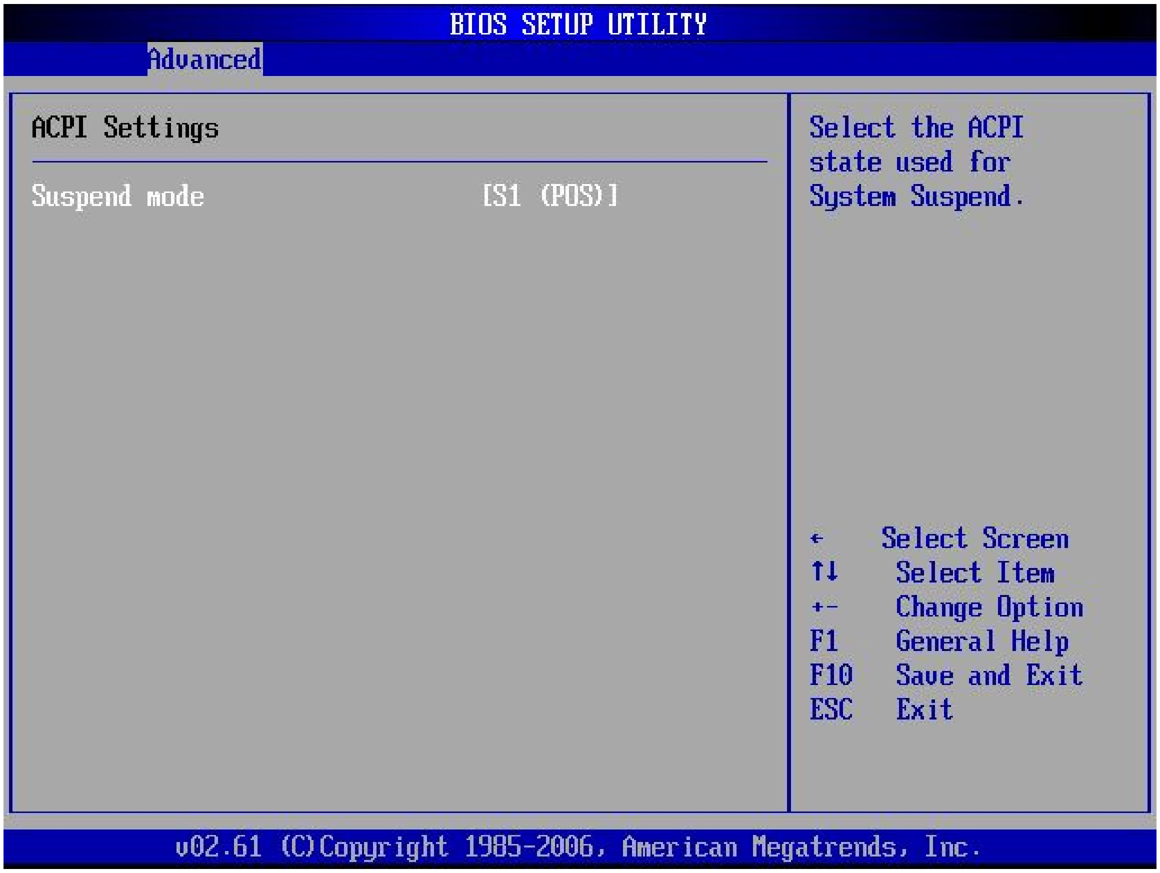
- 0 PWM
- 1 PWM
- 2 PWM
- 4 PWM
- 8 PWM
- 16 PWM
- 32 PWM
- 64 PWM

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
  - System Temperature
- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - Fan1 Speed
  - Fan2 Speed
- **Voltages**: The following system voltages are monitored
  - CPU Core
  - +1.80V
  - +3.30V
  - +12.0V
  - +5VSB
  - VBAT

6.3.5 ACPI Configuration

Use the **ACPI Configuration** menu (**BIOS Menu 8**) to select the ACPI state when the system is suspended.



BIOS Menu 8: Advanced ACPI Configuration

➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔ **S1 (POS)** The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

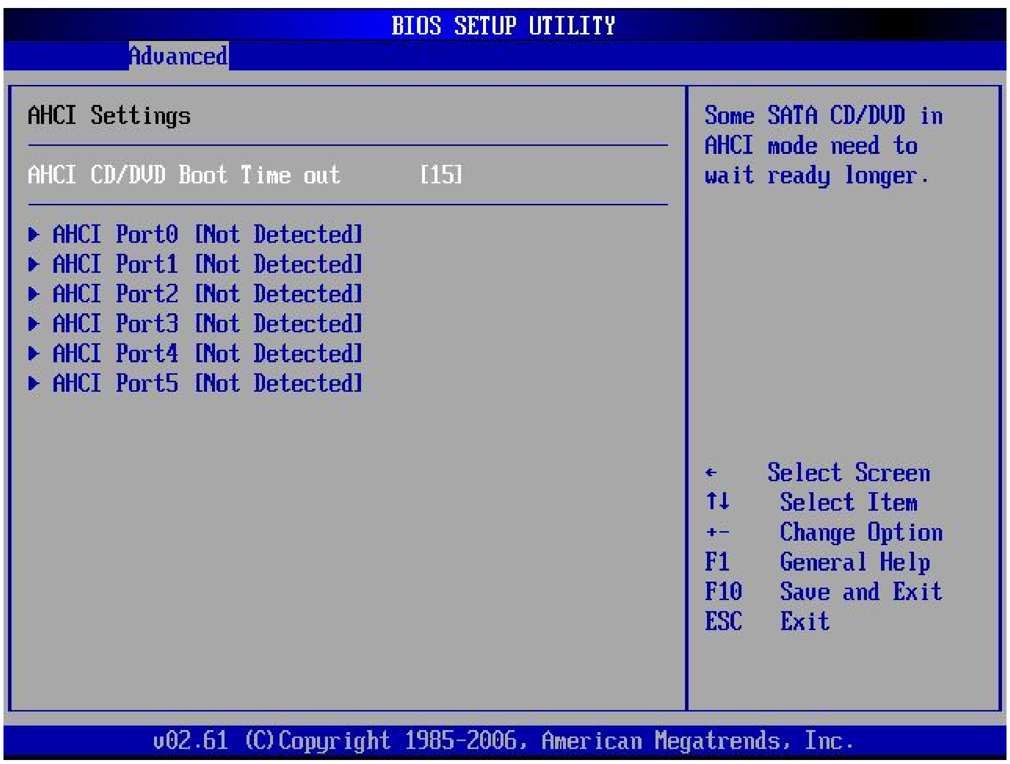
➔ **S3 (STR)** **DEFAULT** The system enters S3(STR) sleep state.

6.3.5.1 AHCI Configuration

NOTE:

Advanced Host Controller Interface (AHCI) is a new programming interface for SATA host controllers. AHCI systems do not have master/slave designation for SATA devices, each device is treated as a master, and hardware-assisted native command queuing.

Use the **AHCI Settings** menu (**BIOS Menu 9**) to report on the auto-detection of devices connected to the onboard SATA drive connectors.



BIOS Menu 9: AHCI Configuration

➔ **AHCI CD/DVD Boot Time out [15]**

Use the AHCI CD/DVD Boot time out to specify the time period before the system times out after trying to detect a SATA CD/DVD in the AHCI. Some CD/DVD in the AHCI may need longer periods of time before they are ready. The time-out options are:

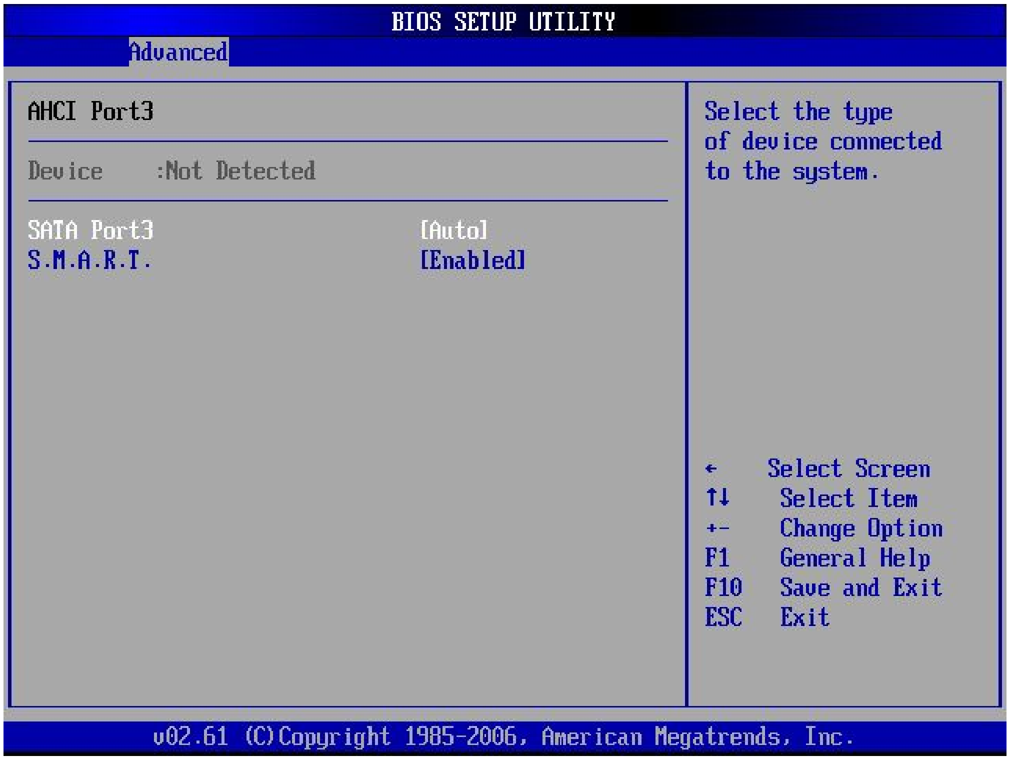
- 0 seconds
- 5 seconds
- 10 seconds
- 15 seconds **DEFAULT**
- 20 seconds
- 25 seconds
- 30 seconds
- 35 seconds

➔ **AHCI Port n [Not Detected]**

Use the **AHCI Port n** BIOS option to check what AHCI (Advanced Host Controller Interface) devices are detected to a specified SATA drive connector. If a device is detected, selecting the BIOS option, e.g. "**AHCI Port 3**" opens a new window.

6.3.5.2 AHCI Port n

Use the **AHCI Port n** configuration menu (**BIOS Menu 10**) to configure the drive connected to SATA connector n.



BIOS Menu 10: AHCI Port n Configuration Menu

➔ **SATA Port n [Auto]**

Use the **SATA Port n** option to enable the system to auto-detect the type of drive connected to SATA drive connector n.

➔ **Auto** DEFAULT Automatically detects the drive type connected to the system

➔ **Not Installed** Specifies no device is connected to the serial port n.

➔ **S.M.A.R.T [Enabled]**

Use the **S.M.A.R.T** option to enable S.M.A.R.T (Self-Monitoring, Analysis, and Reporting Technology) on the drive connected to SATA drive connector n.

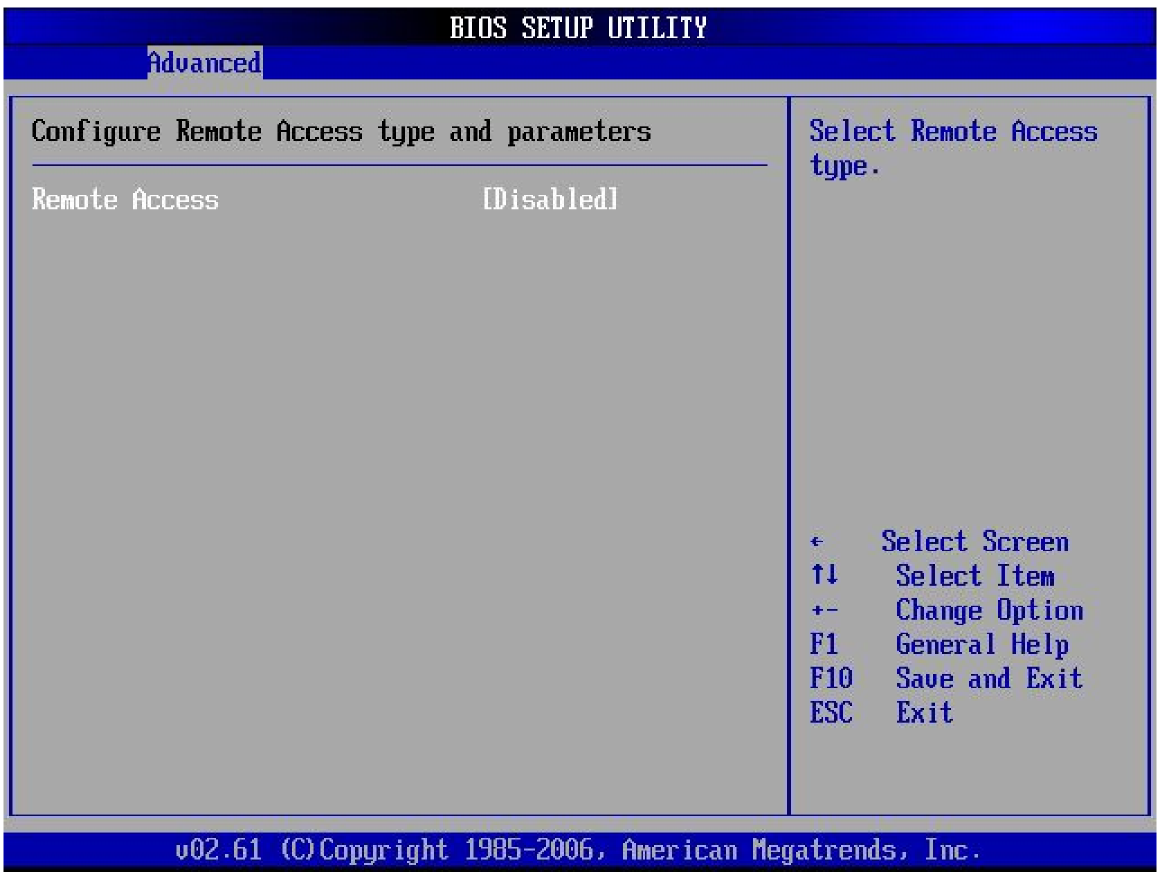
➔ **Enabled** DEFAULT S.M.A.R.T is enabled on the drive connected to SATA

drive connector n on the system

- **Disabled** S.M.A.R.T is disabled on the drive connected to SATA drive connector n on the system

6.3.6 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 11**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 11: Remote Access Configuration [Advanced]

- **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

- ➔ **Disabled** DEFAULT Remote access is disabled.
- ➔ **Enabled** Remote access configuration options shown below appear:
  - ➔ **Serial Port Number**
  - ➔ **Serial Port Mode**
  - ➔ **Flow Control**
  - ➔ **Redirection after BIOS POST**
  - ➔ **Terminal Type**
  - ➔ **VT-UTF8 Combo Key Support**
  - ➔ **Sredir Memory Display Delay**

  These configuration options are discussed below.

➔ Serial Port Number [COM1]

Use the **Serial Port Number** option to select the serial port used for remote access.

- ➔ **COM1** DEFAULT System is remotely accessed through COM1
- ➔ **COM2** System is remotely accessed through COM2

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ Base Address, IRQ [3F8h,4]

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ Serial Port Mode [115200 8,n,1]

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ Redirection After BIOS POST [Always]

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

- ➔ **Disabled** The console is not redirected after POST
- ➔ **Boot Loader** Redirection is active during POST and during Boot Loader
- ➔ **Always** **DEFAULT** Redirection is always active (Some OSes may not work if set to Always)

➔ Terminal Type [ANSI]

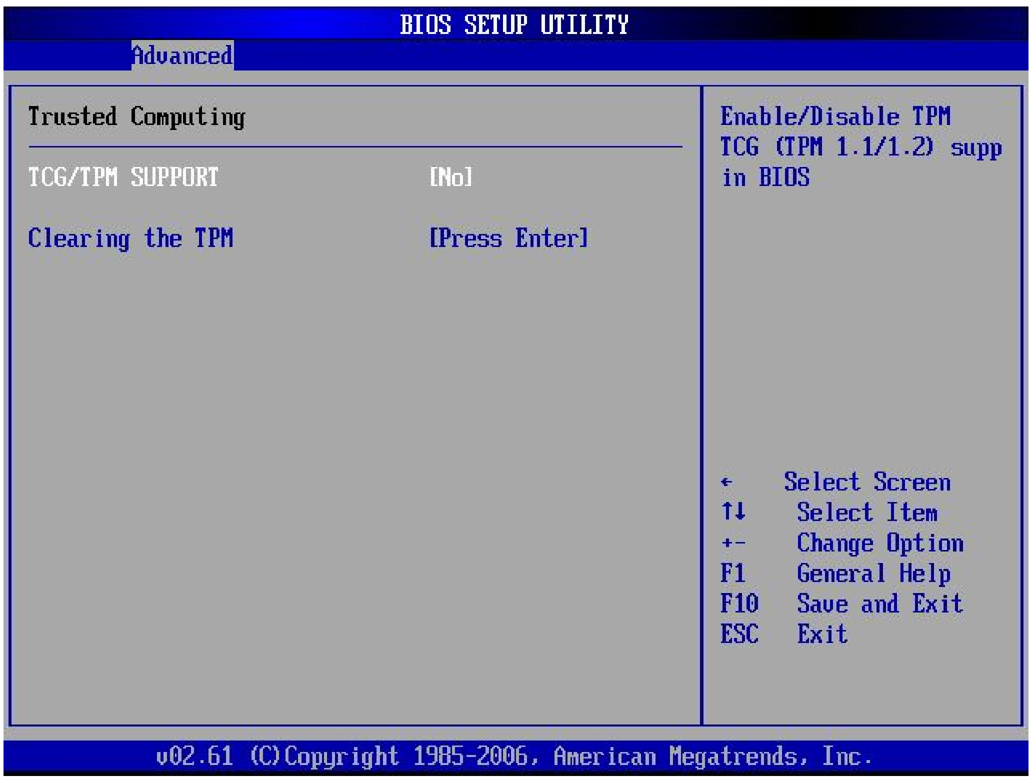
Use the **Terminal Type** BIOS option to specify the remote terminal type.

- ➔ **ANSI** **DEFAULT** The target terminal type is ANSI

- ➔ **VT100** The target terminal type is VT100
- ➔ **VT-UTF8** The target terminal type is VT-UTF8

6.3.7 Trusted Computing

Use the **Trusted Computing** menu (Error! Reference source not found.) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 12: Trusted Computing

➔ **TCG/TPM Support [No]**

Use the **TCG/TPM Support** option to configure support for the TPM.

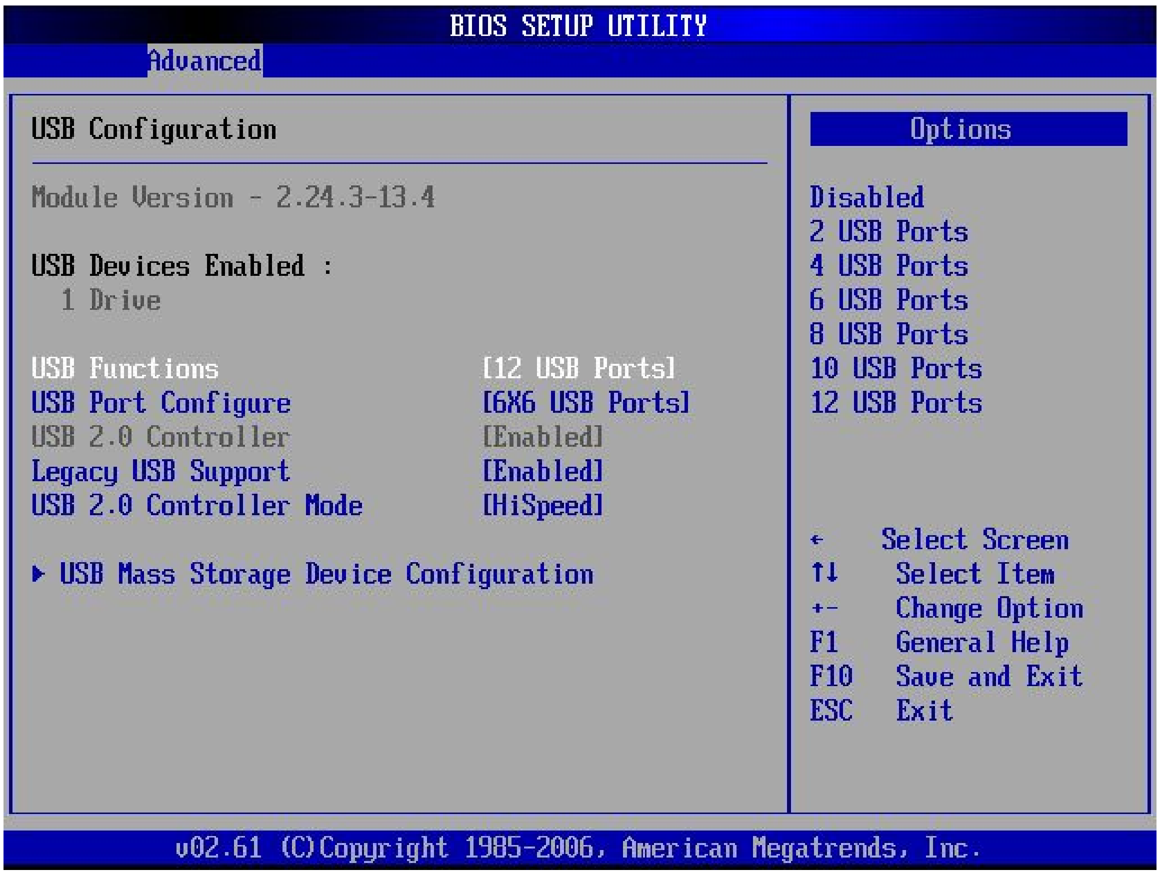
- ➔ **No** **DEFAULT** TPM support is disabled.
- ➔ **Yes** TPM support is enabled.

➔ **Clearing the TPM [Press Enter]**

Use the **Clearing the TPM** option to clear the information stored in the TPM.

6.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 13**) to read USB configuration information and configure the USB settings.



BIOS Menu 13: USB Configuration

➔ **USB Functions [12 USB Ports]**

Use the **USB Functions** option to specify how many USB ports must be activated.

➔ **Disabled** None of the ports are USB 1.1 compatible

- → **2 USB Ports** Two ports are activated
- → **4 USB Ports** Four ports are activated
- → **6 USB Ports** Six ports are activated
- → **8 USB Ports** Eight ports are activated
- → **10 USB Ports** Ten ports are activated
- → **12 USB Ports** **DEFAULT** Twelve ports are activated

→ **USB Port Configure [6X6 USB Ports]**

Use the **USB Port Configure** option to specify the USB port configuration

- → **8x4 USB ports** The USB configuration is 8x4 ports
- → **6X6 USB Ports** **DEFAULT** The USB configuration is 6x6 ports

→ **USB 2.0 Controller [Enabled]**

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

- → **Disabled** USB function disabled
- → **Enabled** **DEFAULT** USB function enabled

→ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- ➔ **Disabled** Legacy USB support disabled
- ➔ **Enabled** DEFAULT Legacy USB support enabled
- ➔ **Auto** Legacy USB support disabled if no USB devices are connected

➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

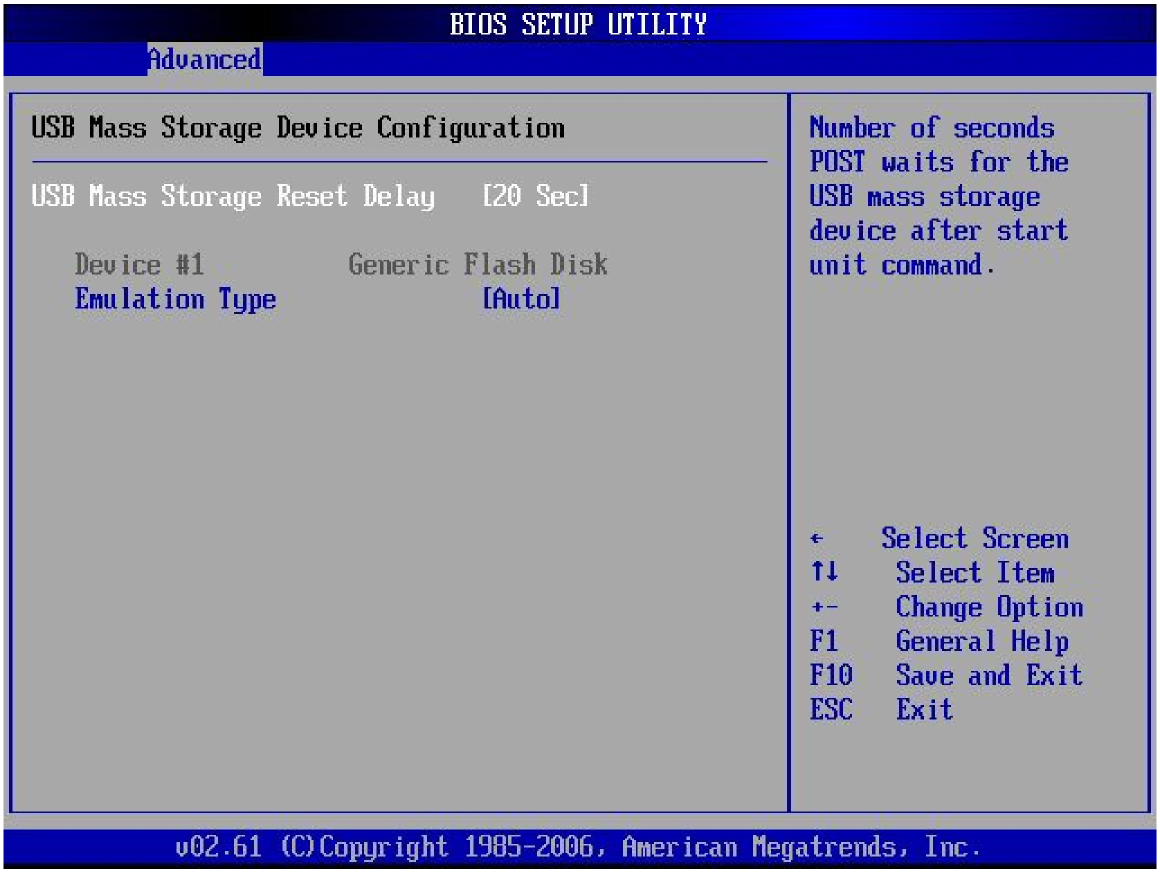
- ➔ **FullSpeed** The controller is capable of operating at 12Mb/s
- ➔ **HiSpeed** DEFAULT The controller is capable of operating at 480Mb/s

6.3.8.1 USB Mass Storage Device Configuration

NOTE:

This option is only available if a USB drive is inserted into the USB port.

Use the USB Mass Storage Device Configuration menu (**BIOS Menu 14**) to configure USB mass storage class devices.



BIOS Menu 14: USB Mass Storage Device Configuration

→ USB Mass Storage Reset Delay [20 Sec]

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

- → **10 Sec** — POST waits 10 seconds for the USB mass storage device after the start unit command.
- → **20 Sec** **DEFAULT** — POST waits 20 seconds for the USB mass storage device after the start unit command.
- → **30 Sec** — POST waits 30 seconds for the USB mass storage device after the start unit command.

➔ **40 Sec** POST waits 40 seconds for the USB mass storage device after the start unit command.

➔ **Device ##**

The **Device##** field lists the USB devices that are connected to the system.

➔ **Emulation Type [Auto]**

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

NOTE:

Please note that the device's formatted type and the emulation type provided by the BIOS must match for a device to boot properly. If both types do not match then device's behavior is undefined. To make sure both types match, format the device using BIOS INT13h calls after selecting the proper emulation option in BIOS setup. The FORMAT utility provided by Microsoft® MS-DOS®, Microsoft® Windows® 95, and Microsoft® Windows® 98 can be used for this purpose.

➔ **Auto** **DEFAULT** BIOS auto-detects the current USB.

➔ **Floppy** The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively.

➔ **Forced FDD** Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32.

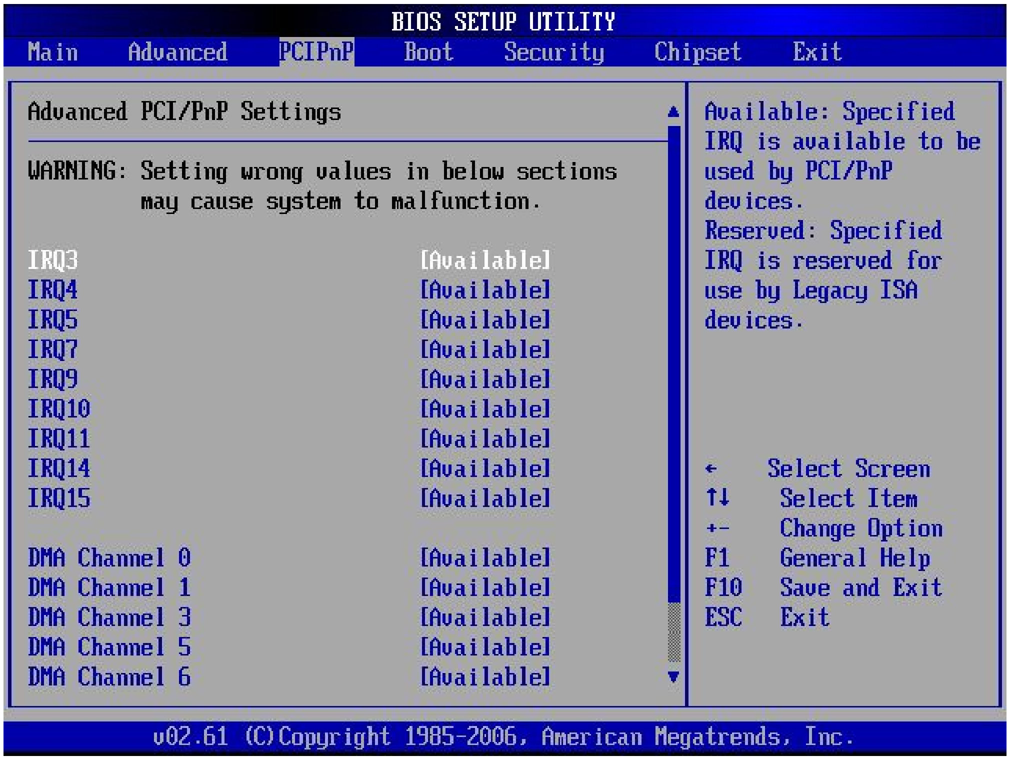
- **Hard Disk** — Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above.
- **CDROM** — Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option.

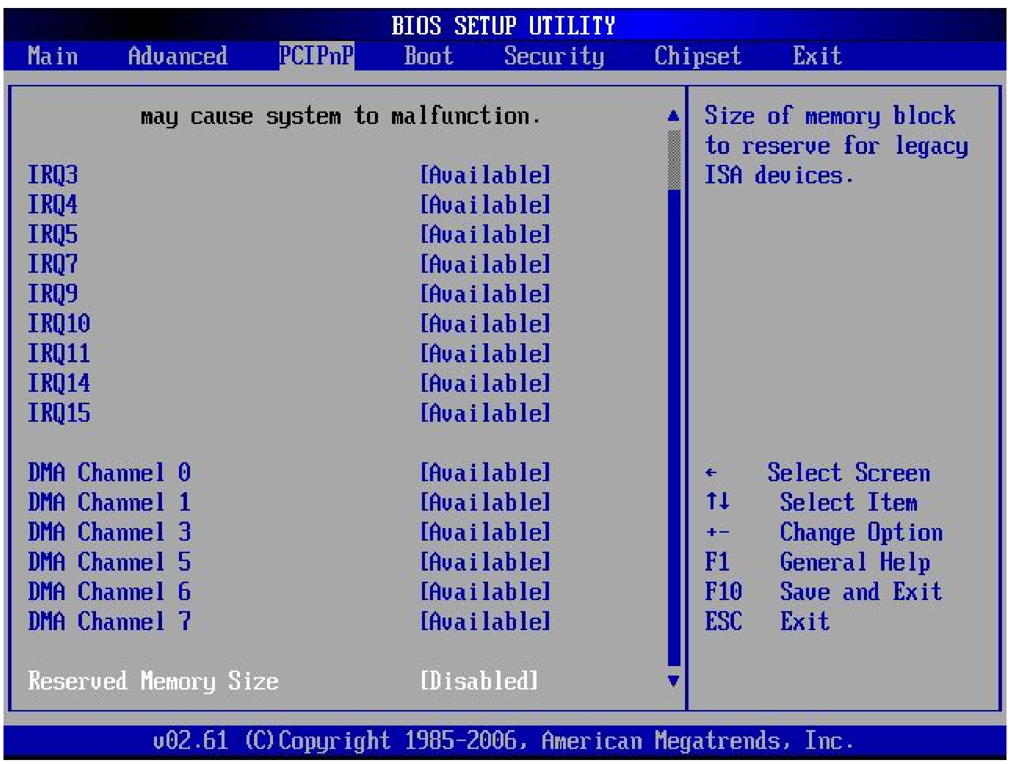
6.4 PCI/PnP

Use the PCI/PnP menu (**BIOS Menu 15**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.





BIOS Menu 15: PCI/PnP Configuration

→ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

→ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

→ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

→ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

→ **Available** **DEFAULT** The specified DMA is available to be used by PCI/PnP devices

→ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0

- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔ **Disabled** DEFAULT No memory block reserved for legacy ISA devices

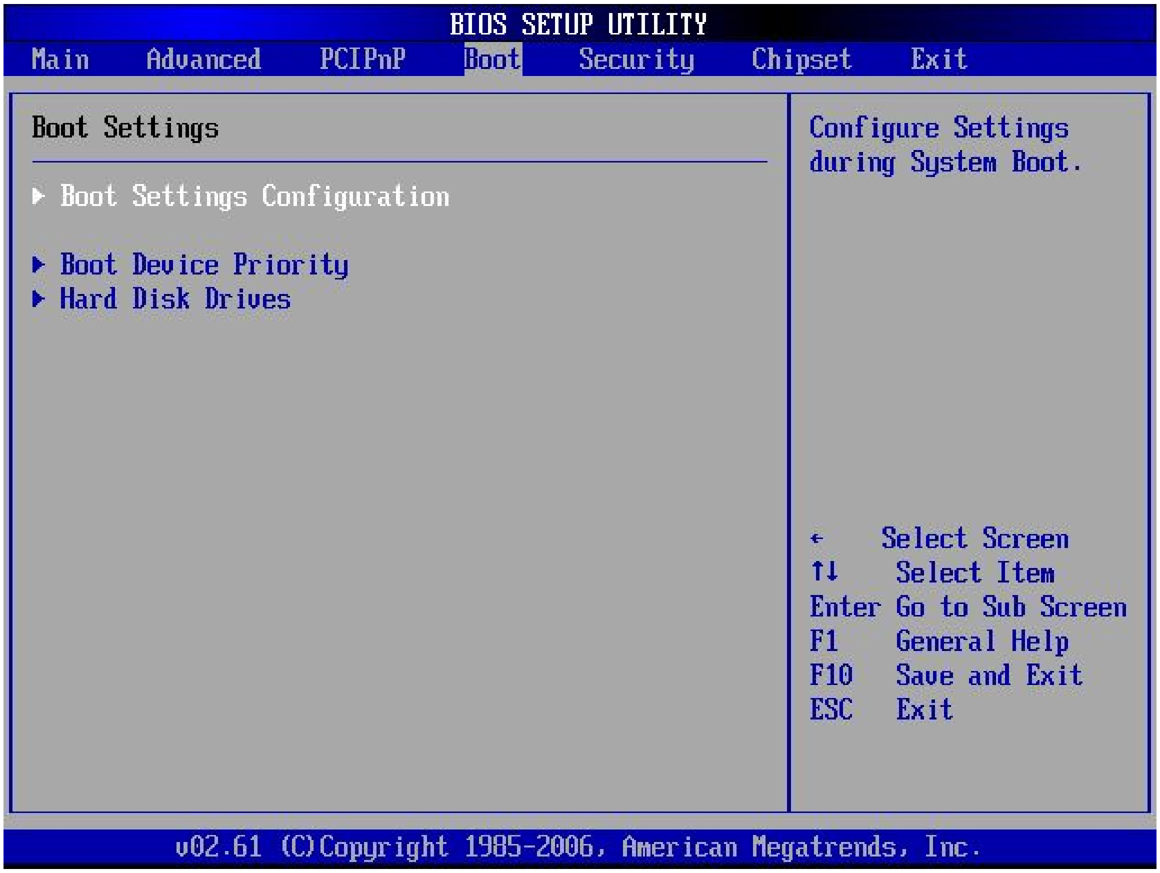
➔ **16K** 16KB reserved for legacy ISA devices

➔ **32K** 32KB reserved for legacy ISA devices

➔ **64K** 54KB reserved for legacy ISA devices

6.5 Boot

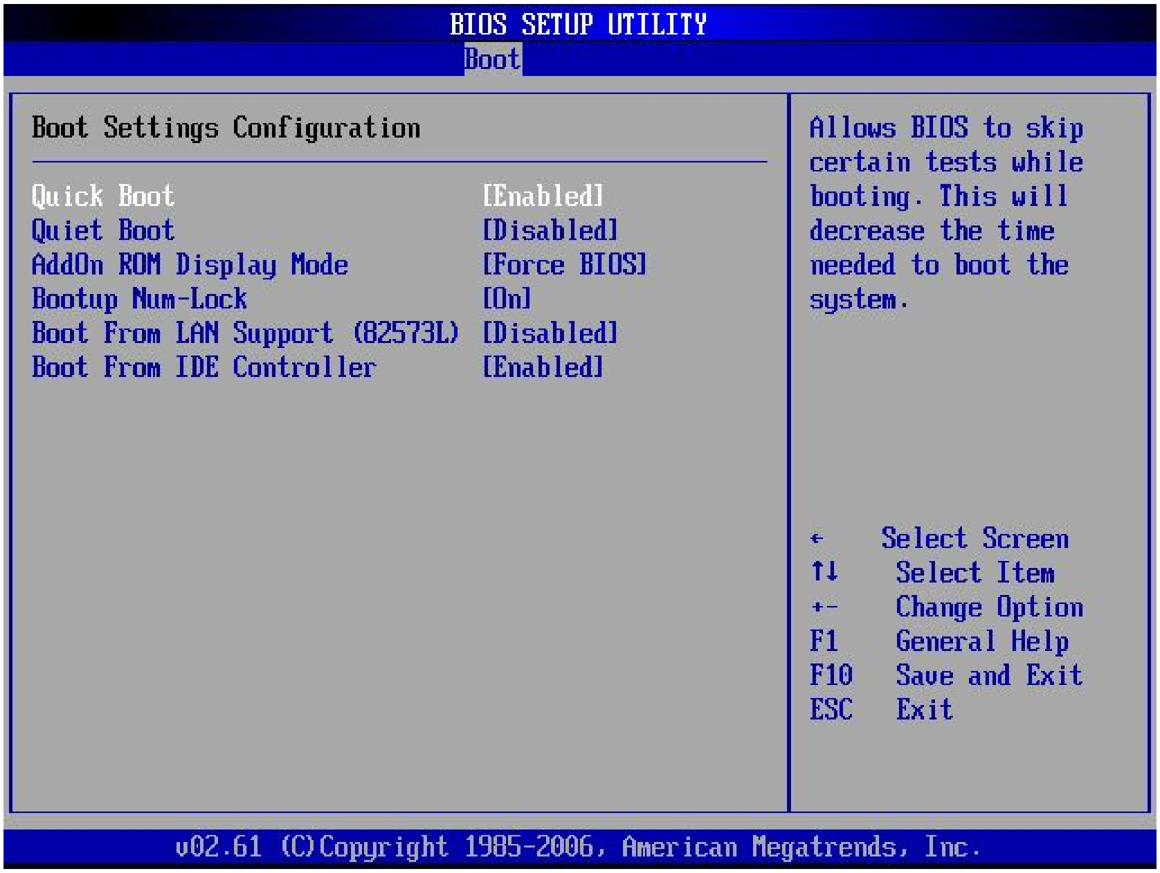
Use the Boot menu (BIOS Menu 16) to configure system boot options.



BIOS Menu 16: Boot

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (**BIOS Menu 17**) to configure advanced system boot options.



BIOS Menu 17: Boot Settings Configuration

→ Quick Boot [Enabled]

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

- → **Disabled** — No POST procedures are skipped
- → **Enabled** DEFAULT — Some POST procedures are skipped to decrease the system boot time

→ Quiet Boot [Disabled]

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

- → **Disabled** DEFAULT — Normal POST messages displayed

- **Enabled** OEM Logo displayed instead of POST messages

AddOn ROM Display Mode [Force BIOS]

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

- **Force BIOS** DEFAULT Allows the computer system to force a third party BIOS to display during system boot.
- **Keep Current** Allows the computer system to display the information during system boot.

Bootup Num-Lock [On]

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

- **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
- **On** DEFAULT Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Boot From LAN Support (82573L) [Disabled]**

NOTE:

The Intel® ICH9DO Southbridge has an integrated GbE controller. To enable this controller to boot the system, please refer to the Southbridge BIOS configuration menu.

Use the **BOOT From LAN Support (82573L)** option to enable the Intel® 82573L PCIe GbE controller to boot the system.

➔ **Disabled** Cannot be booted from a remote system through the Intel® 82573L PCIe GbE controller

➔ **Enabled** **DEFAULT** Can be booted from a remote system through the Intel® 82573L PCIe GbE controller

➔ **Boot From IDE Controller [Disabled]**

Use the **Boot From IDE Controller** option to enable the IDE controller to boot the system.

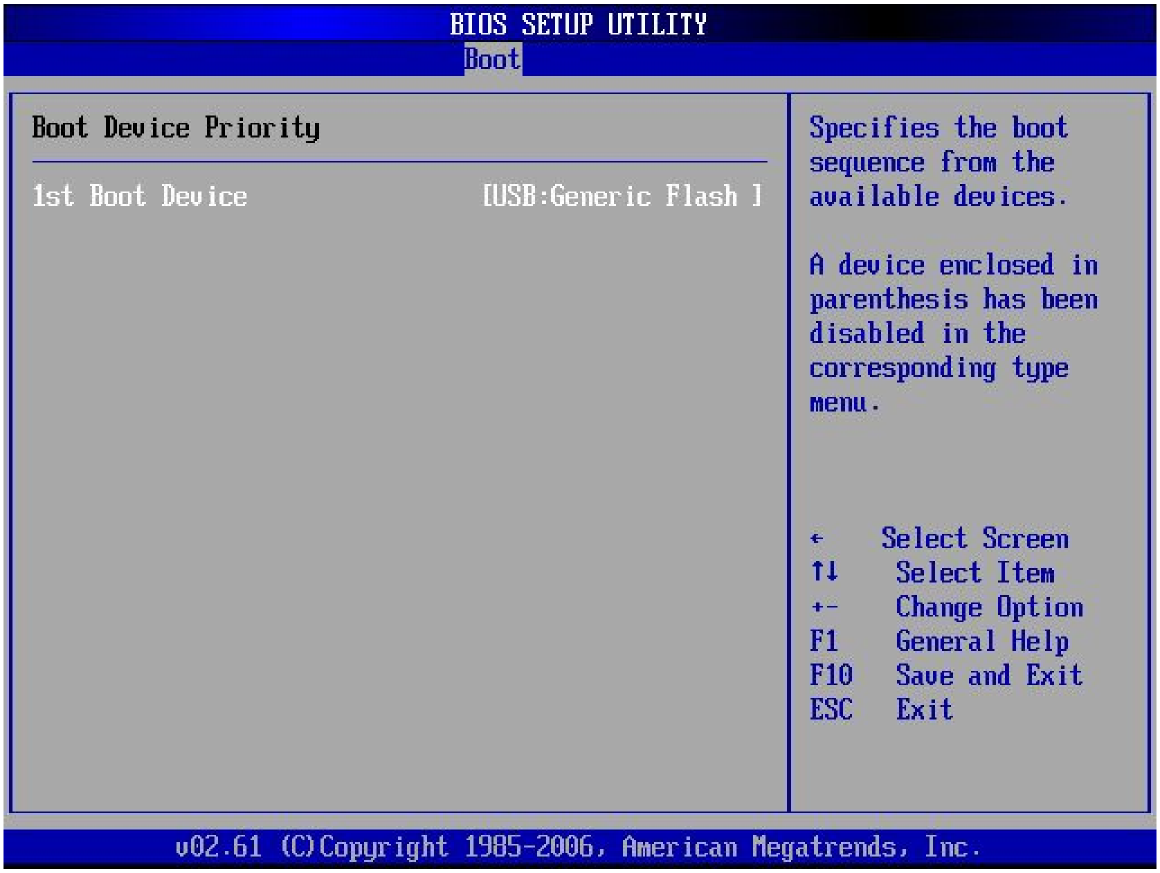
➔ **Disabled** Cannot be booted from the IDE controller

➔ **Enabled** **DEFAULT** Can be booted from the IDE controller

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 18**) to specify the boot sequence from the available devices. The following options are available:

- 1st Boot Device
- 2nd Boot Device



BIOS Menu 18: Boot Device Priority Settings

6.5.3 Hard Disk Drives

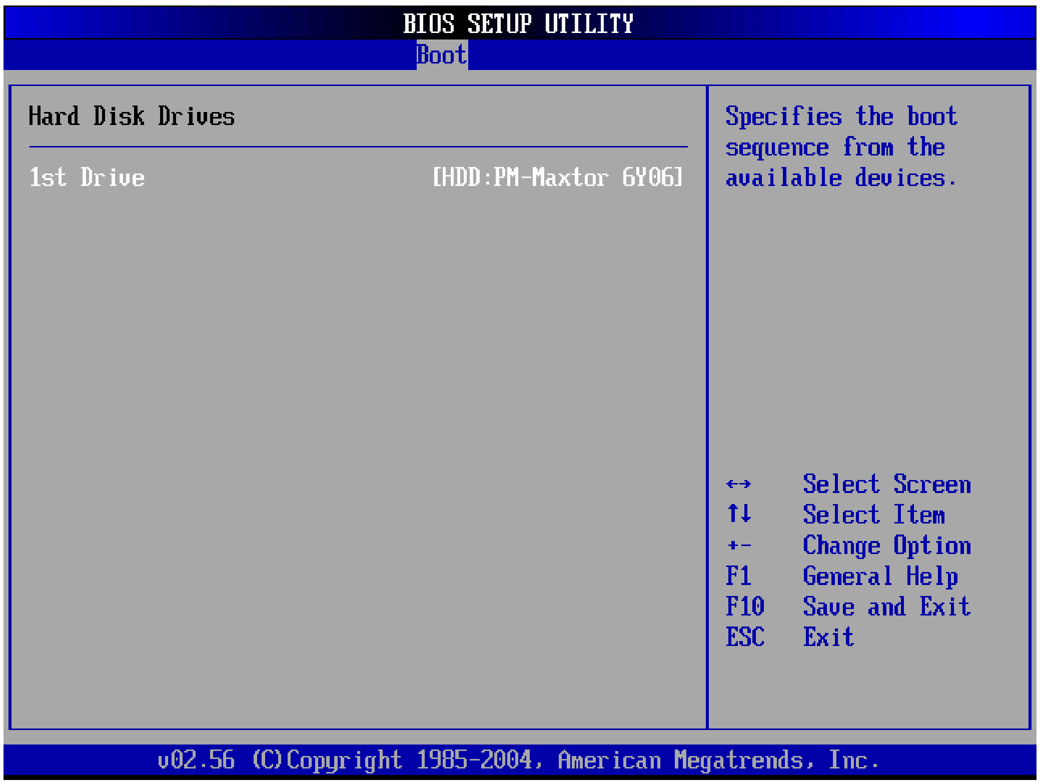
Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

- 1st Drive [HDD: PM-(part number)]
- 2nd Drive [HDD: PS-(part number)]
- 3rd Drive [HDD: SM-(part number)]
- 4th Drive [HDD: SM-(part number)]

NOTE:

Only the drives connected to the system are shown. For example, if only two HDDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

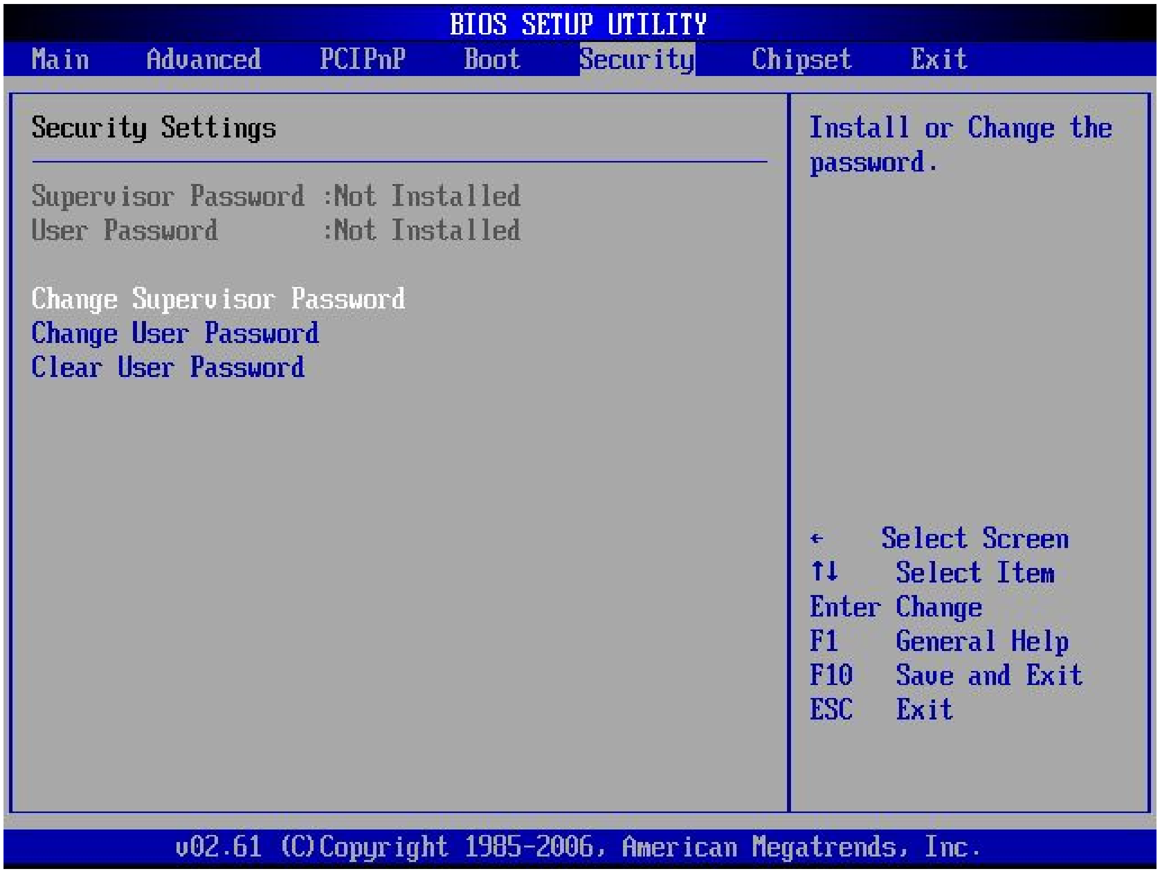
The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available HDDs is shown. Select the first HDD the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.



BIOS Menu 19: Hard Disk Drives

6.6 Security

Use the Security menu (BIOS Menu 20) to set system and user passwords.



BIOS Menu 20: Security

➔ Change Supervisor Password

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ Change User Password

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be cleared, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Clear User Password**

Use the **Clear User Password** to clear a user's password. The default for this option is **Not Installed**. If a user password must be cleared, use this option.

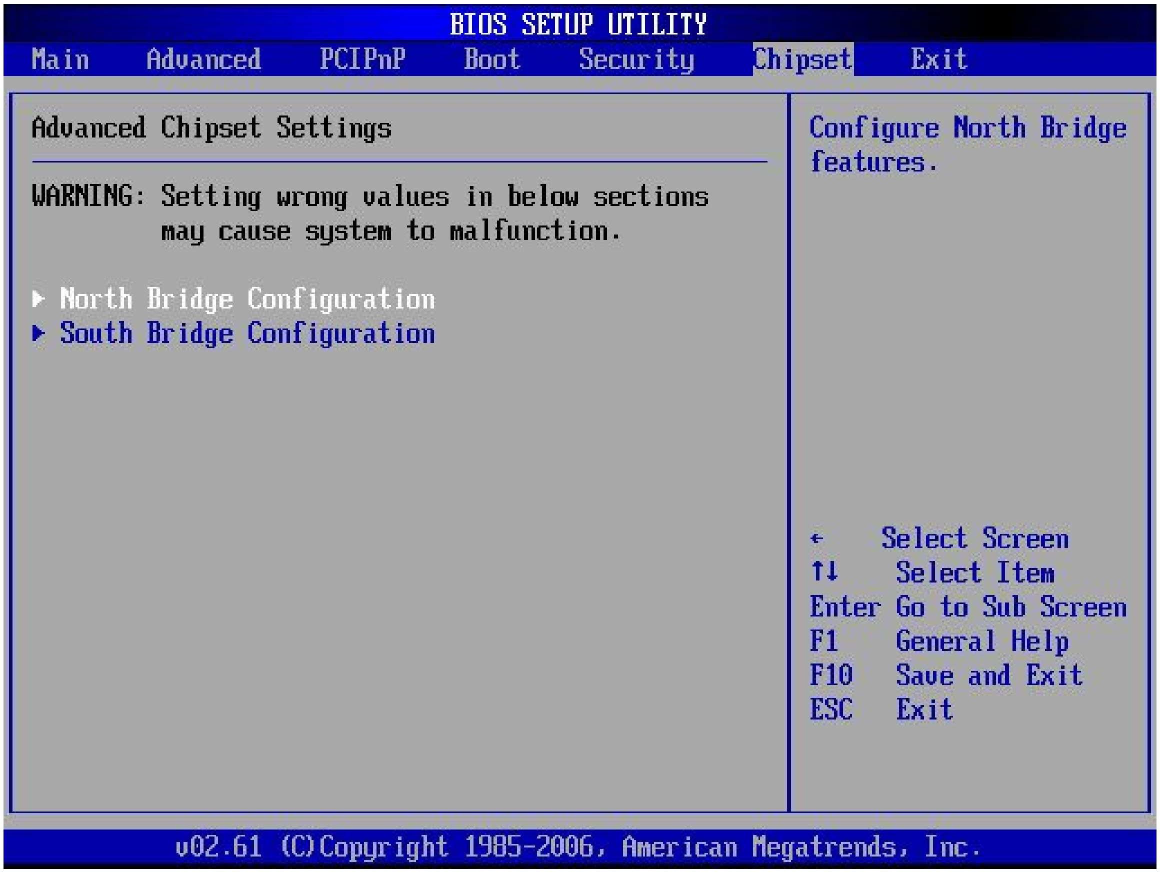
6.7 Chipset

Use the **Chipset** menu to access the NorthBridge and SouthBridge configuration menus

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WARNING:

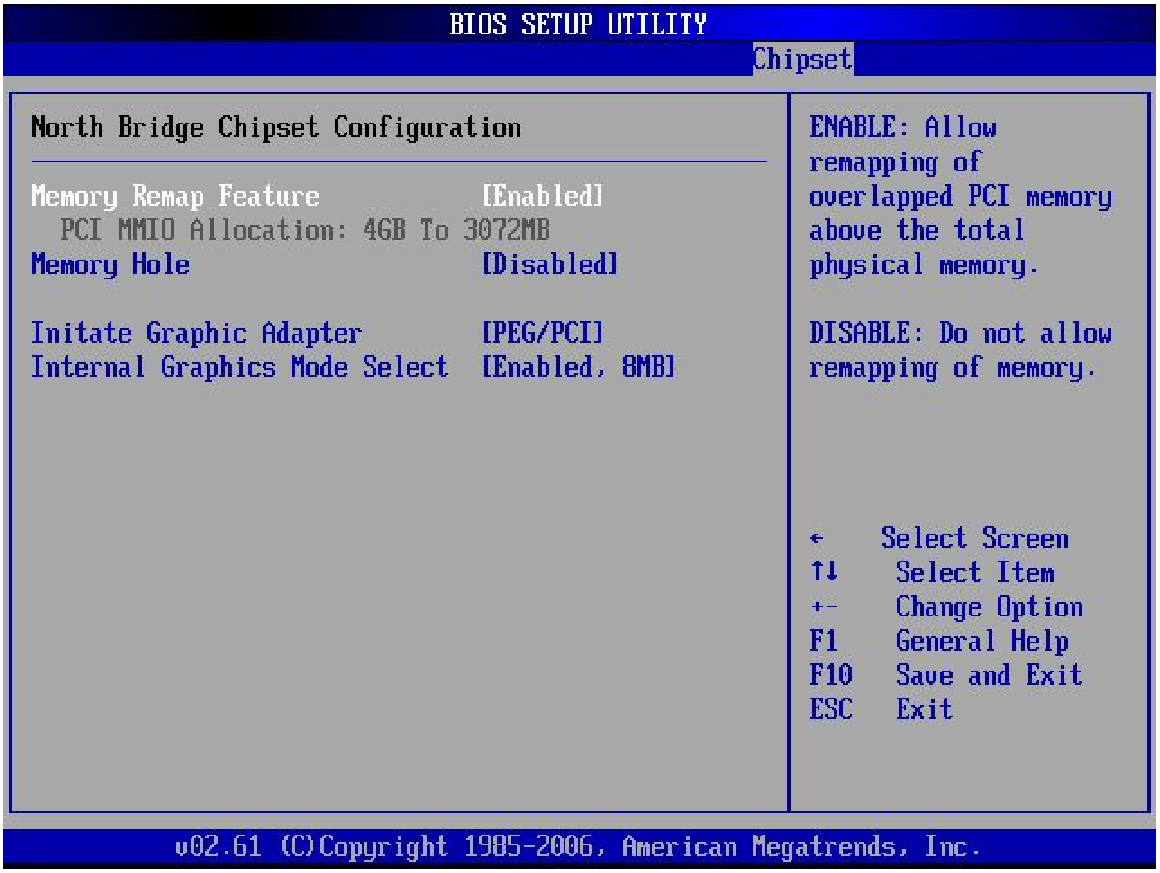
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 21: Chipset

6.7.1 NorthBridge Chipset Configuration

Use the NorthBridge Chipset Configuration menu (BIOS Menu 22) to configure the Northbridge chipset settings.



BIOS Menu 22:NorthBridge Chipset Configuration

→ Memory Remap Feature [Enabled]

Use the **Memory Remap Feature** option to allow the overlapped PCI memory above the total physical memory to be remapped.

- → **Enabled** DEFAULT Overlapped PCI memory can be remapped
- → **Disabled** Overlapped PCI memory cannor be remapped

→ Memory Hole At 15M – 16M [Disabled]

The **Memory Hole At 15M – 16M** reserves the memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an

older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

- ➔ **Disabled** **DEFAULT** Memory is not reserved for ISA expansion cards
- ➔ **Enabled** Memory is reserved for ISA expansion cards

➔ **Initiate Graphic Adapter**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PEG/IGD
- PEG/PCI **DEFAULT**
- PCI/PEG
- PCI/IGD

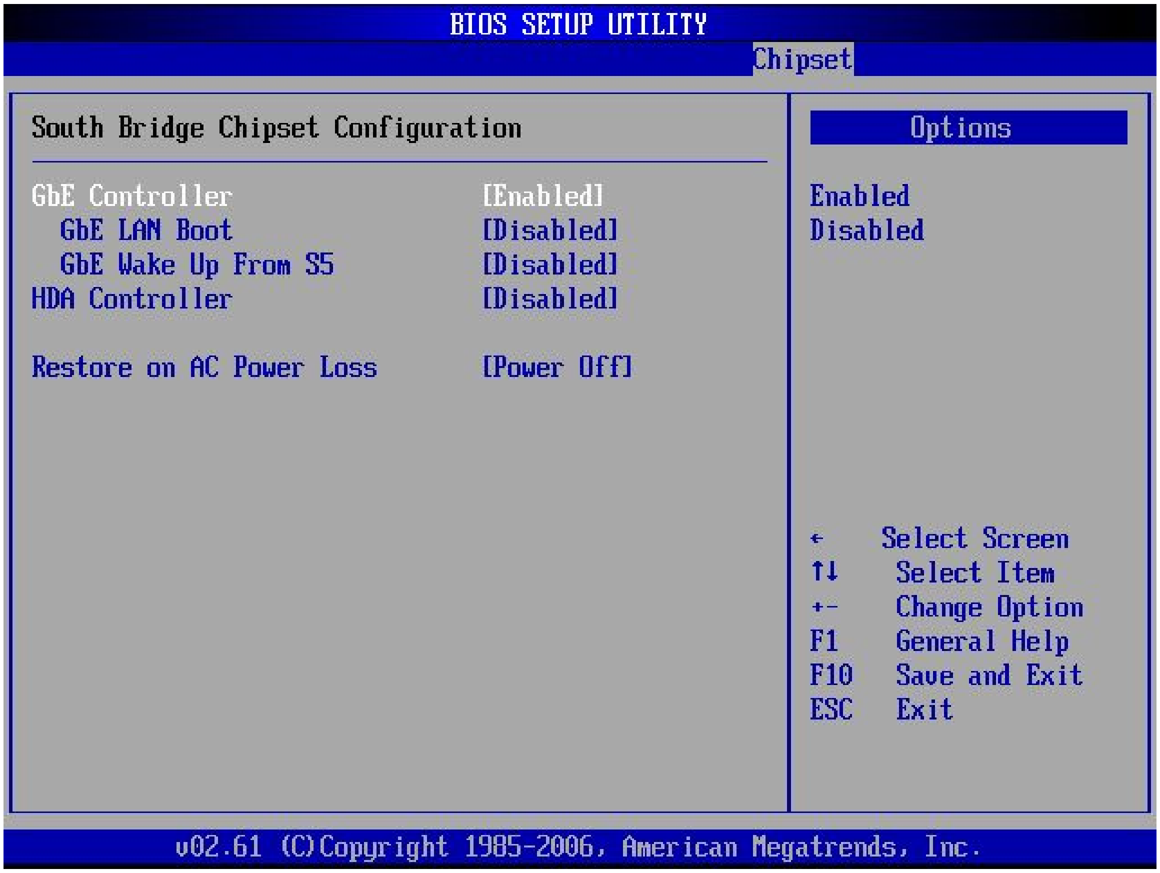
➔ **Internal Graphics Mode Select [Enable, 8MB]**

The **Internal Graphic Mode Select** option determines the amount of system memory that can be used by the Internal graphics device.

- ➔ **Enable, 1MB** 1MB of memory used by internal graphics device
- ➔ **Enable, 8MB** **DEFAULT** 8MB of memory used by internal graphics device

6.7.2 SouthBridge Configuration

Use the SouthBridge Configuration menu (BIOS Menu 23) to configure the Southbridge chipset.



BIOS Menu 23:SouthBridge Chipset Configuration

➔ **GbE Controller [Enabled]**

Use the **GbE Controller** option to enable or disable the GbE controller on the Southbridge chipset.

➔ **Enabled** DEFAULT The GbE controller is enabled

➔ **Disabled** The GbE controller is disabled

➔ GbE LAN Boot [Disabled]

Use the **GbE LAN Boot** option to enable the Southbridge GbE to boot the system.

➔ **Disabled**	**DEFAULT**	Southbridge GbE controller cannot boot the system
➔ **Enabled**		Southbridge GbE controller can boot the system

➔ GbE Wake Up from S5 [Disabled]

Use the **GbE Wake Up from S5** option to enable the Southbridge GbE to arouse the system from an S5 sleep state. In the S5 state the computer consumes a minimal amount of power, no user mode or system mode code is run, and the system's context is not preserved by the hardware. The system must be restarted to return to the Working state.

➔ **Disabled**	**DEFAULT**	Southbridge GbE controller cannot rouse the system from an S5 sleep state
➔ **Enabled**		Southbridge GbE controller can rouse the system from an S5 sleep state

➔ HDA Controller [Disabled]

Use the **HDA Controller** option to enable the Southbridge high definition audio controller. If the optional IEI AC-KIT-833HD has been connected to the system, or any other HDA device, this option should be enabled.

➔ **Disabled**	**DEFAULT**	Southbridge HDA controller is disabled
➔ **Enabled**		Southbridge HDA controller is enabled

➔ Restore on AC Power Loss [Power Off]

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

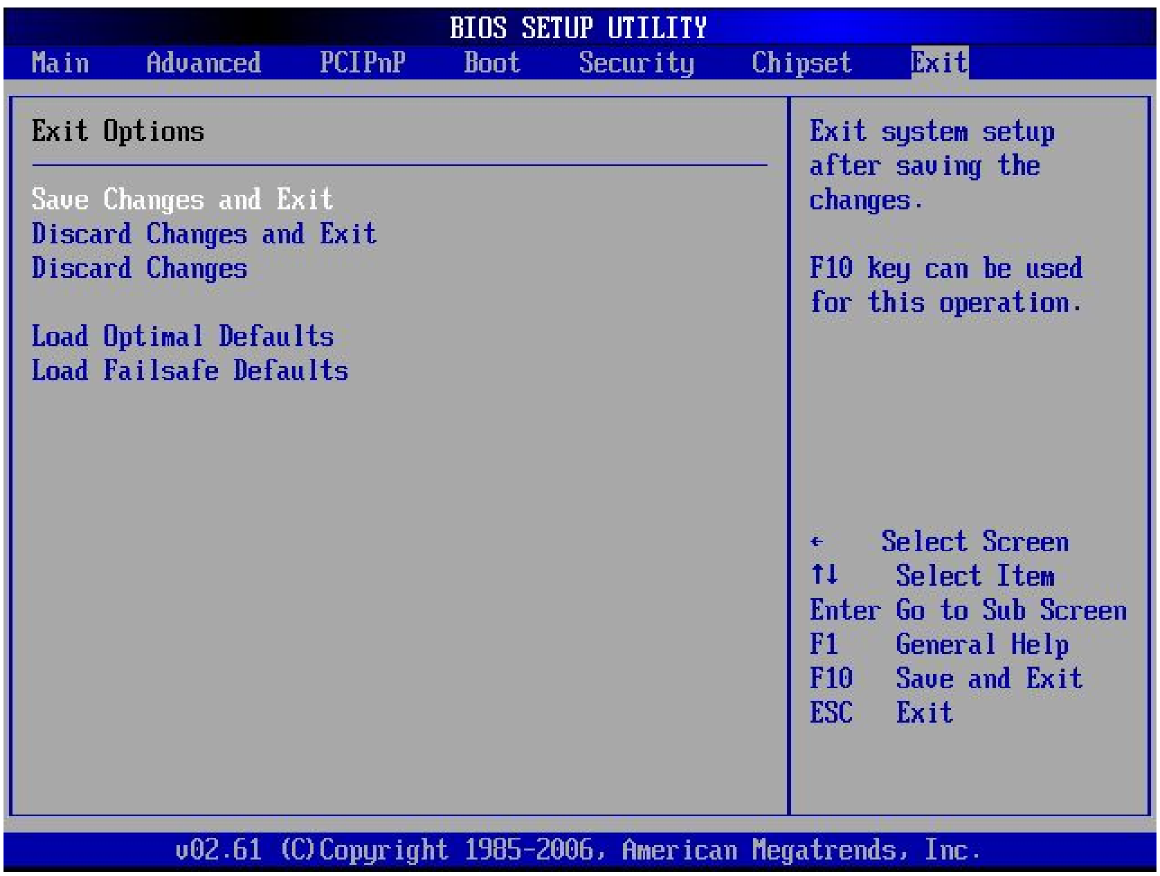
➔ **Power Off** **DEFAULT** The system remains turned off

➔ **Power On** The system turns on

➔ **Last State** The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

6.8 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 24:Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

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Chapter

7

Software Drivers

7.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Intel® chipset driver
- LAN driver
- Audio driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the PCIE-Q350 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the system does not initiate the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (where **X:** is the system CD drive) to access the IEI Driver CD main menu.

Step 2: The driver main menu appears (**Figure 7-1**).



Figure 7-1: Introduction Screen

Step 3: Click PCIE-Q350.

Step 4: A new screen with a list of available drivers appears (Figure 7-2).



Figure 7-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 7-2**. Detailed driver installation instructions follow below.

7.3 Intel® Chipset Driver

To install the Intel® chipset driver, please follow the steps below.

Step 1: Select **PCIE-Q350** from the list in **Figure 7-1**.

Step 2: Select **INF** from the list in **Figure 7-2**.

Step 3: The window shown in **Figure 7-3** appears.

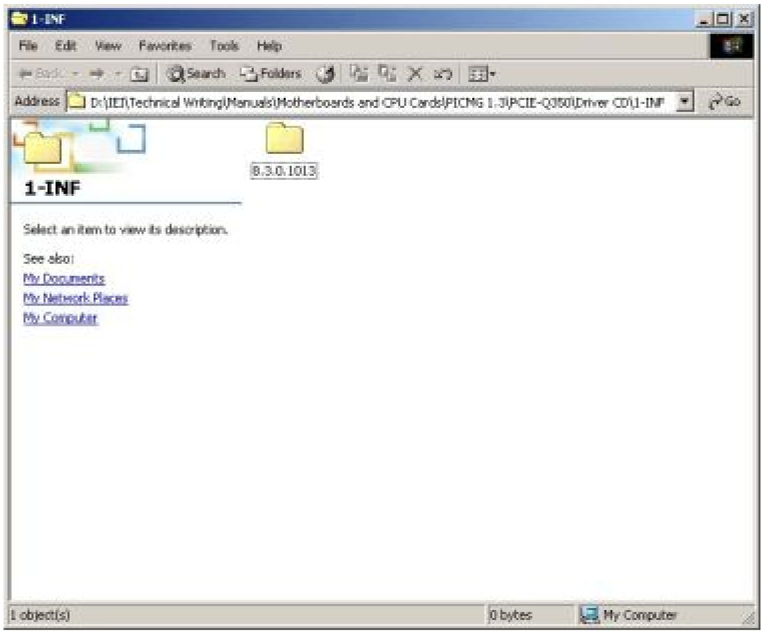


Figure 7-3: Intel® Chipset Driver Directory

Step 4: Click on the directory icon in **Figure 7-3**.

Step 5: The window in **Figure 7-4** appears.

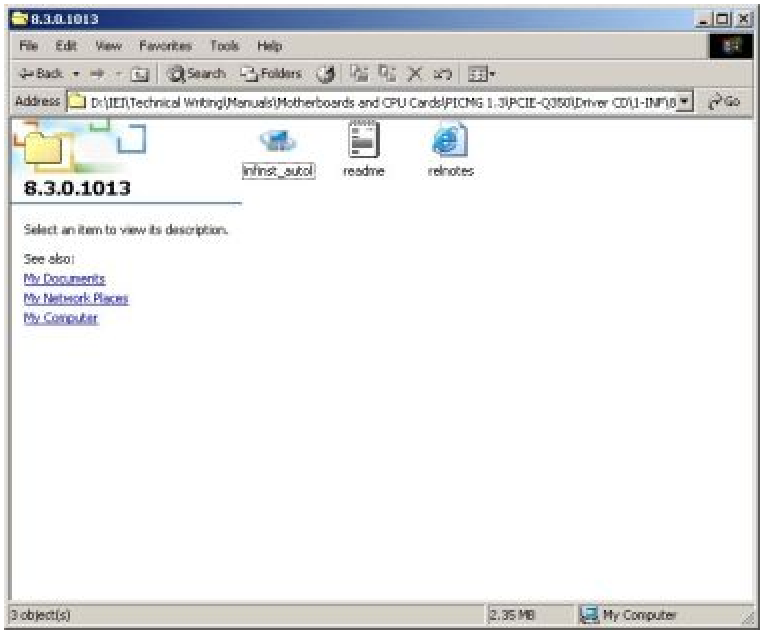


Figure 7-4: Intel® Chipset Driver Setup Icon

Step 6: Click on the **infinst_autol** setup icon in **Figure 7-4**.

Step 7: The **Intel® Package Manager** begins to extract the installation files. See **Figure 7-5**.

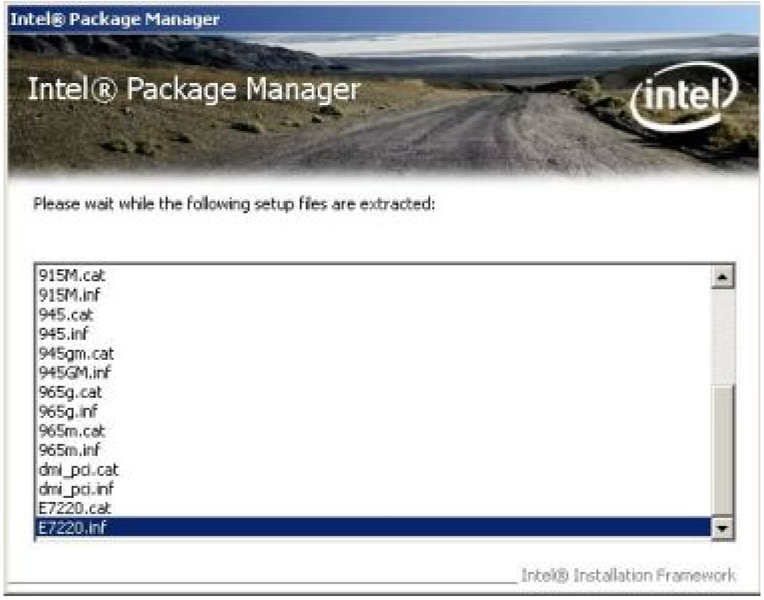


Figure 7-5: Intel® Package Manager

Step 8: The **Intel® Setup Welcome** screen. See **Figure 7-6**.



Figure 7-6: Intel® Setup Welcome Screen

Step 9: Click **NEXT** to continue.

Step 10: The Intel® license agreement in appears.



Figure 7-7: Intel® Chipset Driver License Agreement

Step 11: Accept the terms and conditions by clicking **YES**.

Step 12: The **Readme** file in **Figure 7-8** appears.



Figure 7-8: Readme File

Step 13: Click **NEXT** to continue.

Step 14: The driver is then installed.

Step 15: When the installation process is complete, the Setup Complete screen appears. See **Figure 7-9**.



Figure 7-9: Intel® Chipset Driver Complete Installation Screen

Step 16: To complete the chipset driver installation, click **FINISH**.

7.4 Intel® Graphics Media Accelerator Driver

To install the chipset driver, please follow the steps below:

Step 1: Select the VGA driver from the list in **Figure 7-2**.

Step 2: A new window opens. See **Figure 7-10**.

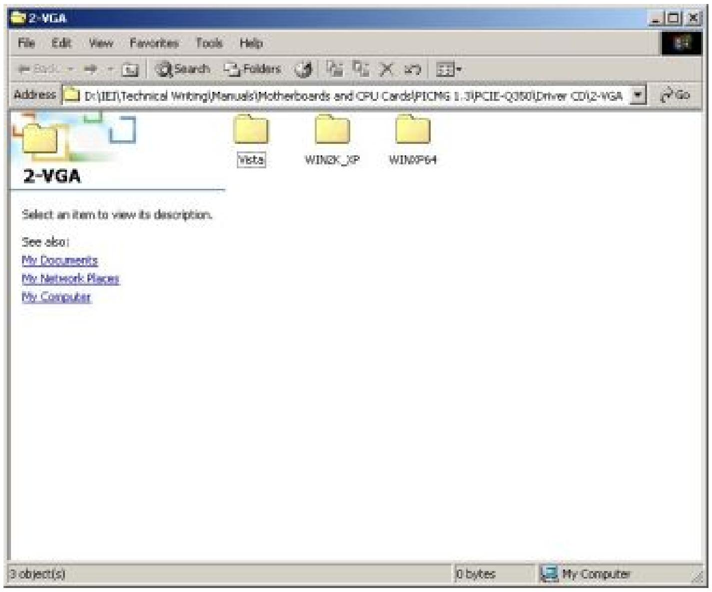


Figure 7-10: Select the Operating System

Step 3: Select the operating system from those shown in **Figure 7-10**.

Step 4: A new window appears. See **Figure 7-11**.

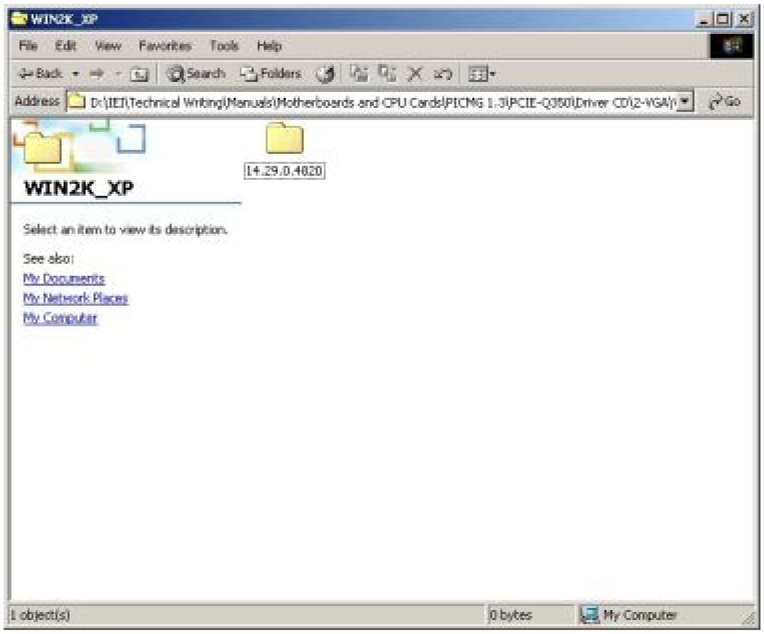


Figure 7-11: Intel® Driver Directory

Step 5: Click the directory icon in **Figure 7-11**.

Step 6: A new window appears. See **Figure 7-12**.

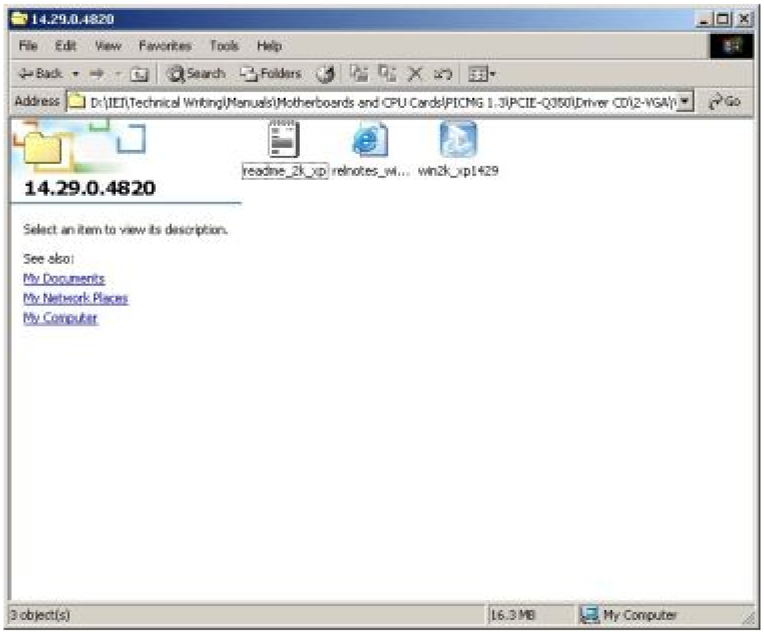


Figure 7-12: Intel® VGA Driver Setup Icon

Step 7: Click on the VGA driver installation icon in See **Figure 7-12**.

Step 8: The Readme information file shown in **Figure 7-13** appears.

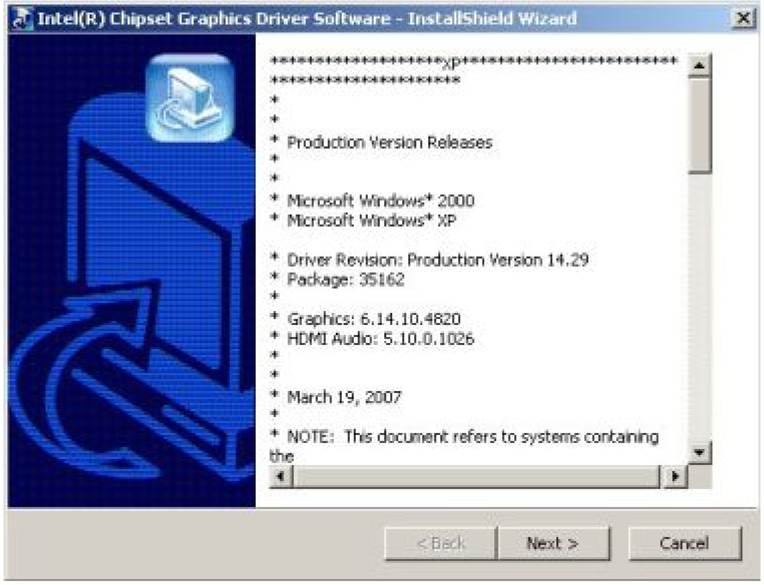


Figure 7-13: GMA Driver Readme File

Step 9: Click **NEXT** to extract the GMA driver files. See **Figure 7-14**.

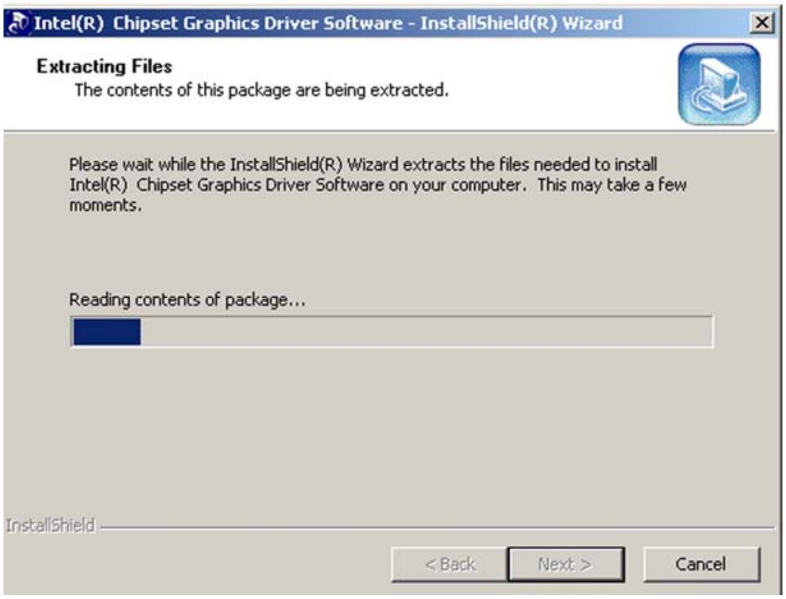


Figure 7-14: GMA Driver File Extraction

Step 10: The welcome screen shown in **Figure 7-15** appears.

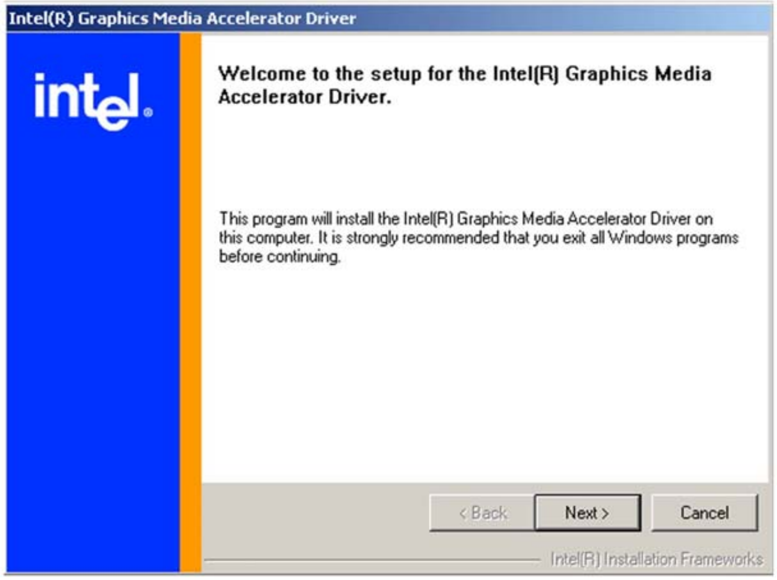


Figure 7-15: GMA Driver Installation Welcome Screen

Step 11: To continue the installation process, click **NEXT**.

Step 12: The license agreement in **Figure 7-16** appears.

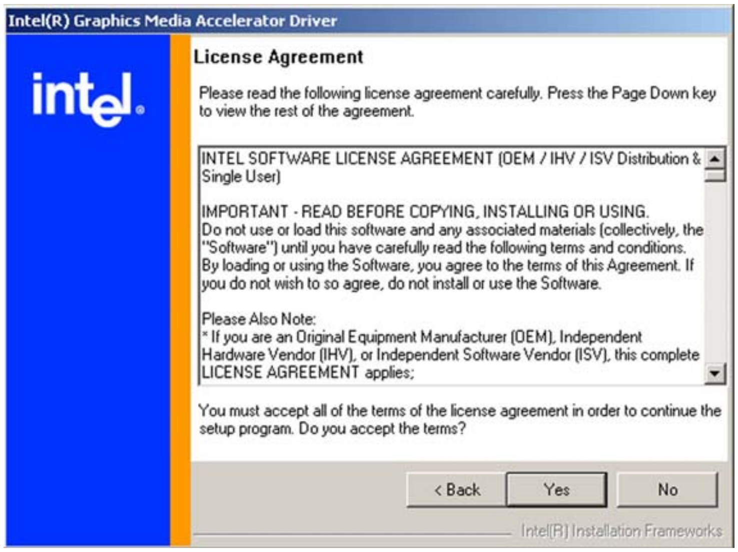


Figure 7-16: GMA Driver License Agreement

Step 13: Click the **YES** in **Figure 7-16** to continue.

Step 14: The installation notice shown in **Figure 7-17** appears.



Figure 7-17: GMA Driver Installing Notice

Step 15: A confirmation screen shown in **Figure 7-18** appears.

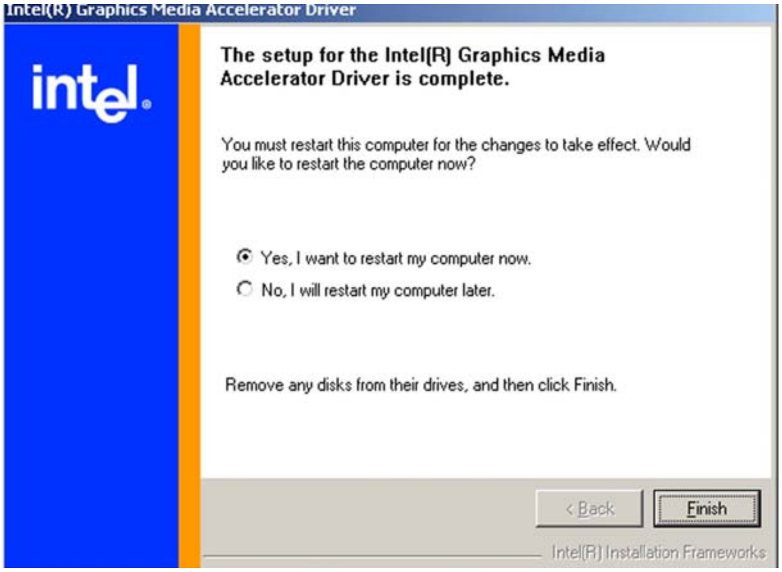


Figure 7-18: GMA Driver Installation Complete

Step 16: After selecting when to restart the computer in **Figure 7-18**, click **FINISH**.

7.5 Intel® 82566 Gigabit LAN Connect Device Driver

To install the Intel® 82566 Gigabit LAN connect device driver, please follow the steps below.

Step 1: Select **LAN** from the list in **Figure 7-2**.

Step 2: The window in **Figure 7-19** appears.

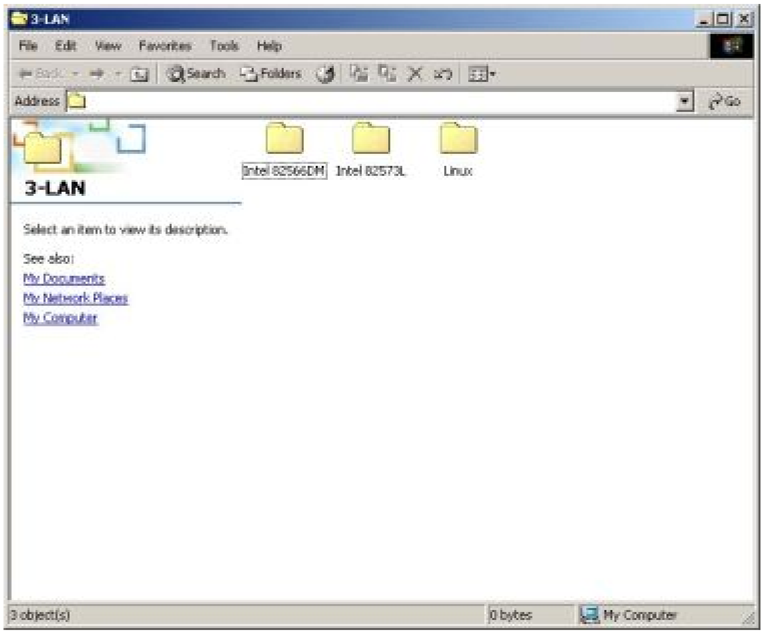


Figure 7-19: Intel® 82566 Driver Directory Icon

Step 3: Click on the **Intel® 82566DM** directory icon in **Figure 7-19**.

Step 4: The window in **Figure 7-20** appears.

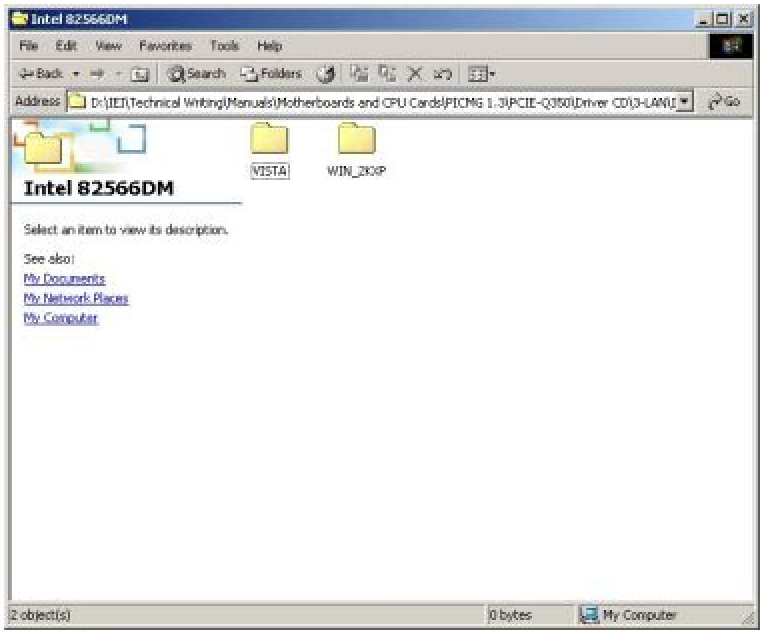


Figure 7-20: Intel® 82566 Operating System

Step 5: Select the Operating System in **Figure 7-20**.

Step 6: The window in **Figure 7-21**appears.

Step 7: In **Figure 7-21** select the operating system type installed on the system.

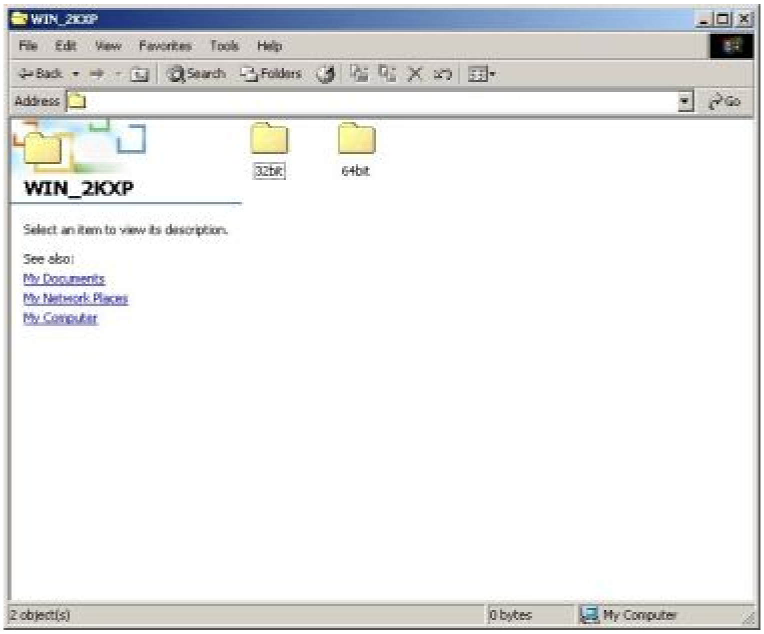


Figure 7-21: Select Operating System Type

Step 8: The window in **Figure 7-22** appears.

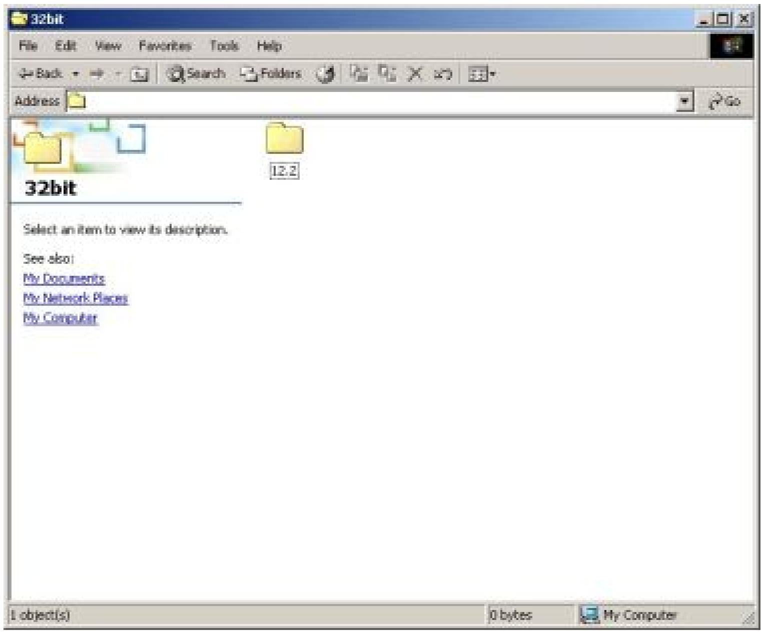


Figure 7-22: Driver Directory

Step 9: Click on the directory icon in **Figure 7-22**.

Step 10: A window containing the Intel® 82566 driver startup icon appears. See **Figure 7-23**.

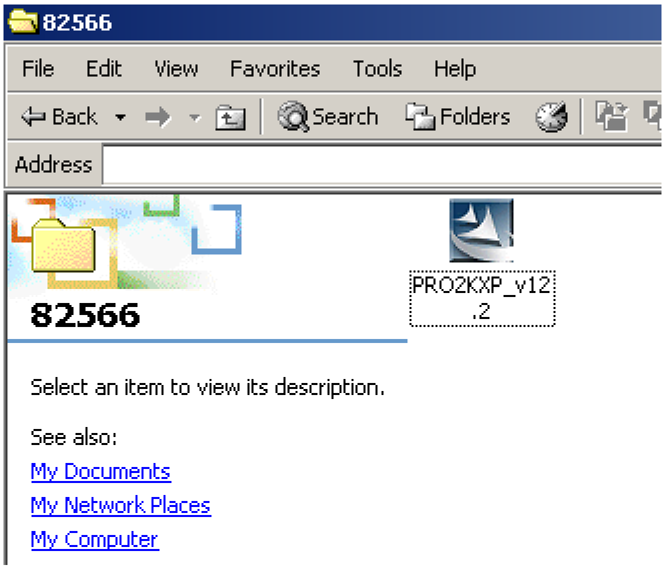


Figure 7-23: Intel® 82566 Device Driver Startup Icon

Step 11: Double click the Intel® 82566 driver startup icon in **Figure 7-23**.

Step 12: The driver begins to extract the installation files.

Step 13: The **Welcome** screen in **Figure 7-24** appears next.

Step 14: Click **NEXT** to continue.



Figure 7-24: Intel® 82566 Welcome Screen

Step 15: The license agreement in **Figure 7-25** appears.

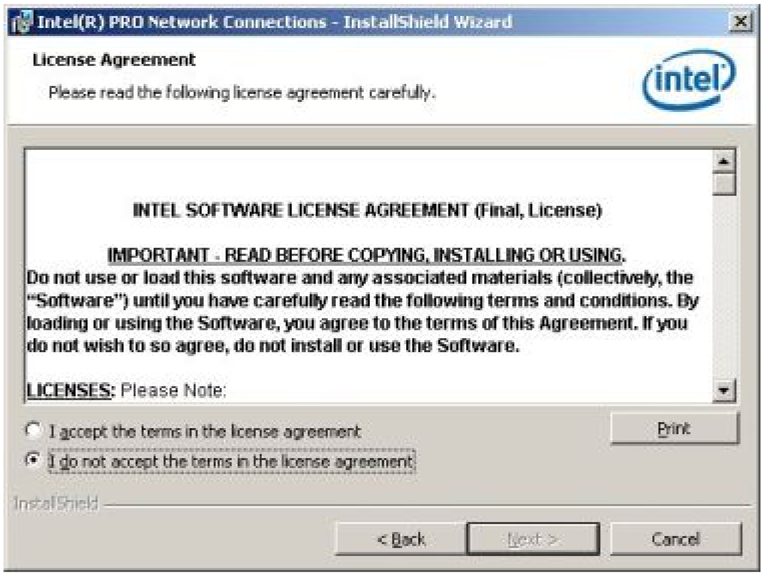


Figure 7-25: Intel® 82566 Driver License Agreement

Step 16: Accept the conditions of the license agreement and click **NEXT** to continue.

Step 17: The **Setup Options** screen in **Figure 7-26** appears next.

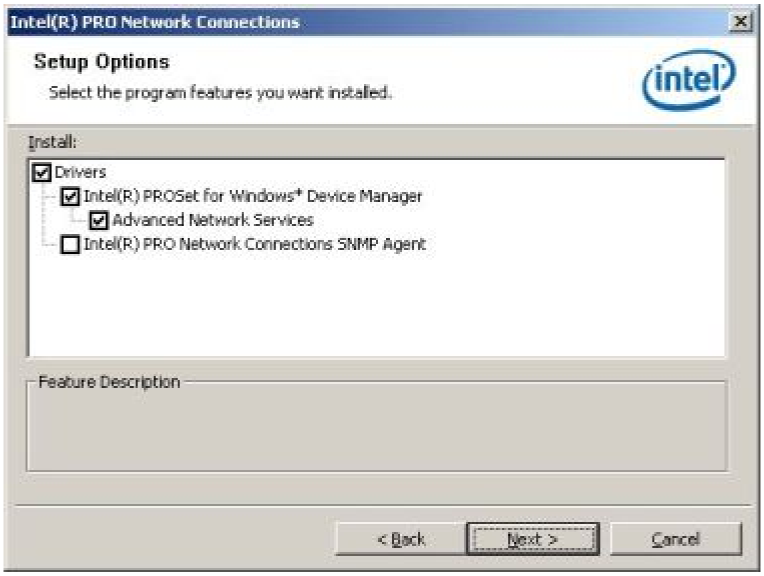


Figure 7-26: Intel® 82566 Driver Setup Options

Step 18: Select the required installation configuration in **Figure 7-26** and click **NEXT** to continue.

Step 19: The **Ready to Install the Program** window in **Figure 7-27** appears.

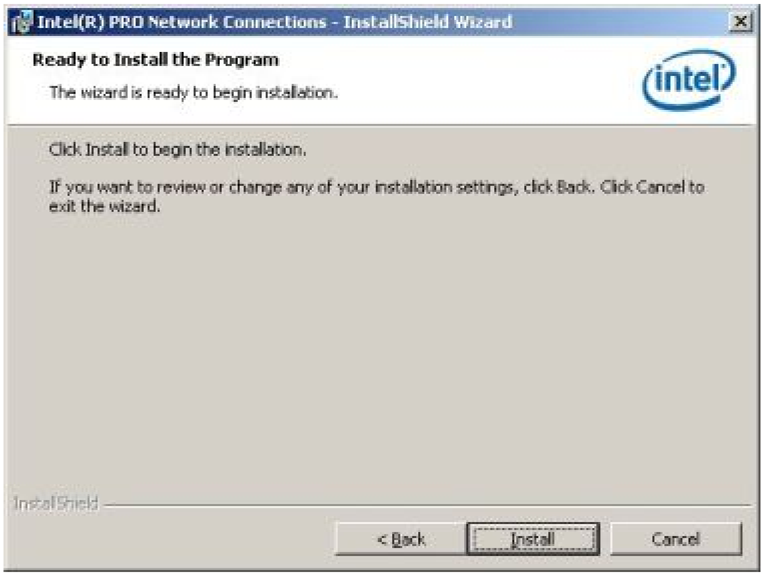


Figure 7-27: Intel® 82566 Driver Installation Ready Window

Step 20: Click **INSTALL** in **Figure 7-27**.

Step 21: The program starts to install the driver. The window in appears.

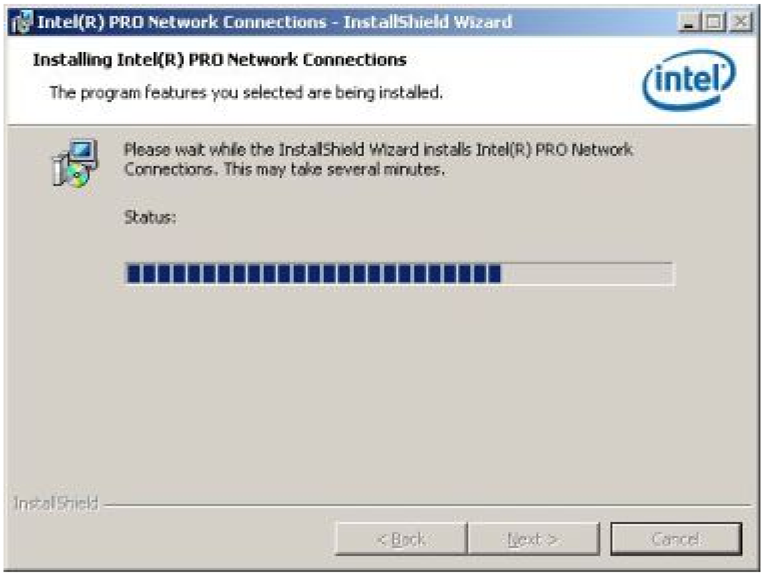


Figure 7-28: Intel® 82566 Driver Installation Progress

Step 22: When the installation is finished. Click **FINISH** in the termination screen.

7.6 Intel® 82573 PCI Express Gigabit Ethernet Controller Driver

To install the Intel® 82573 PCIe GbE controller, please follow the steps below.

Step 1: Select **LAN** from the list in **Figure 7-2**.

Step 2: The window in **Figure 7-29** appears.

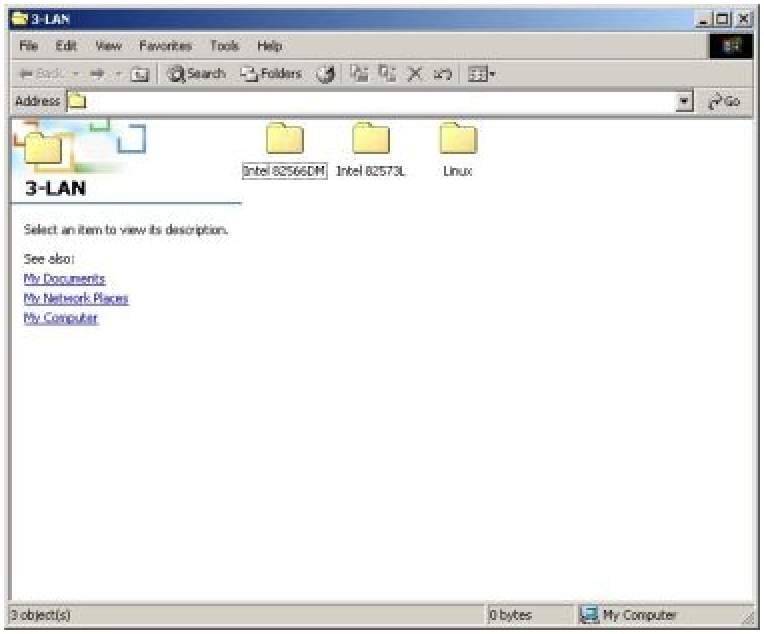


Figure 7-29: Intel® 82573 Driver Directory Icon

Step 3: Click on the **Intel® 82573DM** directory icon in **Figure 7-29**.

Step 4: The window in **Figure 7-30** appears.

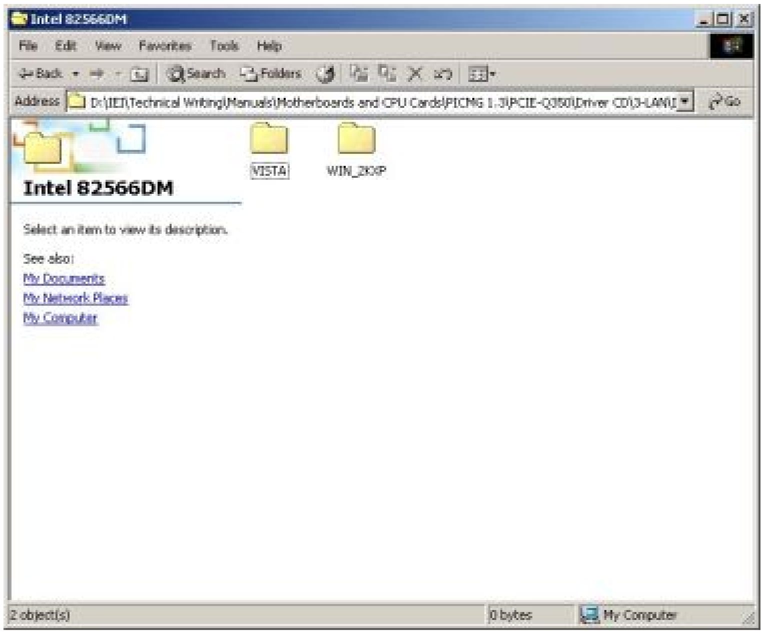


Figure 7-30: Intel® 82573 Operating System

Step 5: Select the Operating System in **Figure 7-30**.

Step 6: The window in **Figure 7-31** appears.

Step 7: In **Figure 7-31** select the operating system type installed on the system.

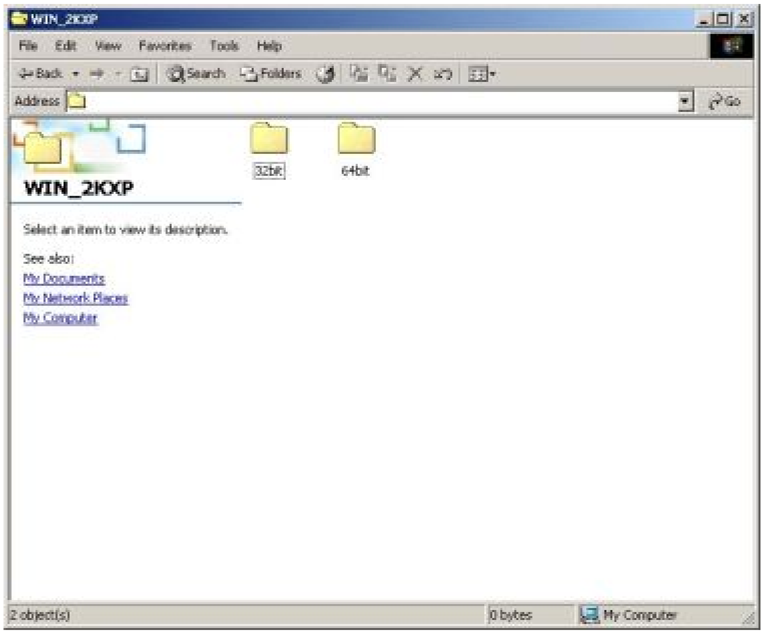


Figure 7-31: Select Operating System Type

Step 8: The window in **Figure 7-32** appears.

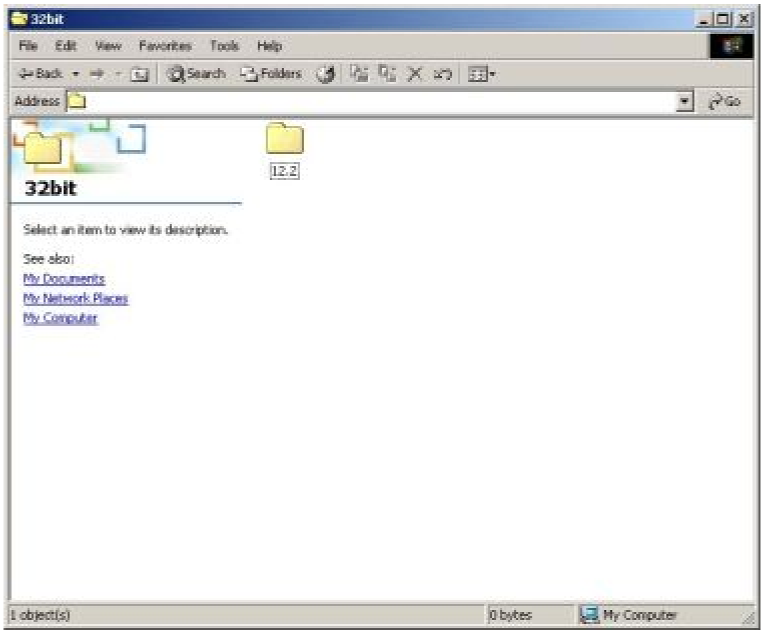


Figure 7-32: Driver Directory

Step 9: Click on the directory icon in **Figure 7-22**.

Step 10: A window containing the Intel® 82573 driver startup icon appears. See **Figure 7-32**.

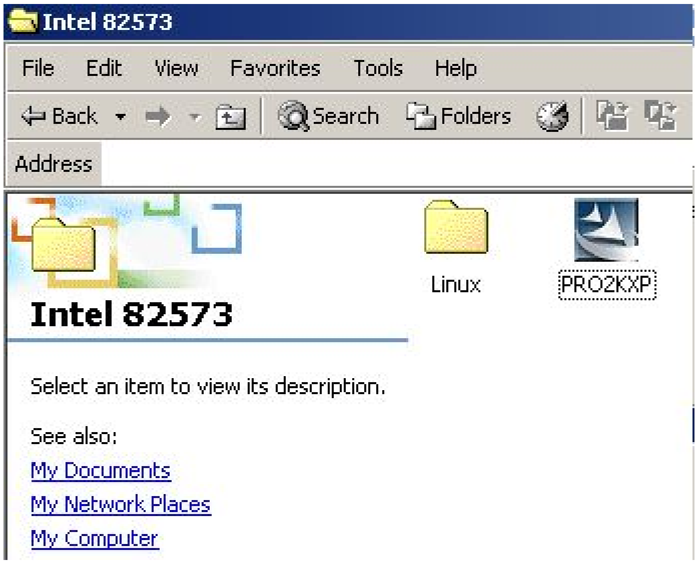


Figure 7-33: Intel® 82573 Driver Startup Icon

Step 11: Click the startup icon in **Figure 7-33**.

Step 12: The **License Agreement** for the Intel® 82573 appears. See **Figure 7-34**.



Figure 7-34: Intel® 82573 License Agreement

Step 13: Accept the license terms and agreements in and click **NEXT** to continue.

Step 14: Next, select the directory in which the files must be saved. See **Figure 7-35**.



Figure 7-35: Intel® 82573 File Location Select

Step 15: Click **NEXT** to continue.

Step 16: The driver begins to extract the installation files. See **Figure 7-36**.



Figure 7-36: Intel® 82573 Installation Files Extraction

Step 17: The Intel® PRO Network Connections window appears. See **Figure 7-37**.



Figure 7-37: Intel® PRO Network Connections window

Step 18: Click **INSTALL DRIVERS** in **Figure 7-37**.

Step 19: The **Intel® PRO Network Connections Welcome** screen in **Figure 7-38** appears.



Figure 7-38: Intel® PRO Network Connections Welcome

Step 20: Click **NEXT** to continue.

Step 21: A new **License Agreement** appears. See **Figure 7-39**.

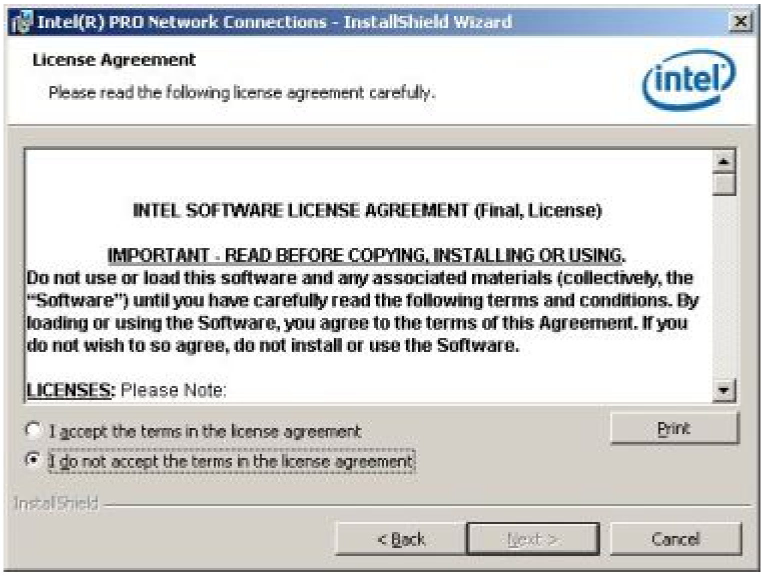


Figure 7-39: License Agreement

Step 22: Accept the terms and conditions in **Figure 7-39** and click **NEXT** to continue.

Step 23: The **Setup Type** window in **Figure 7-40** appears.

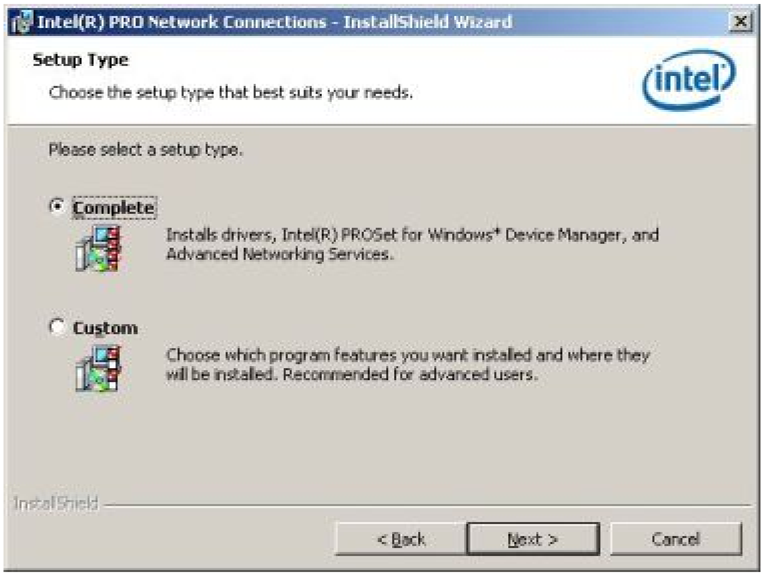


Figure 7-40: Setup Type

Step 24: Select the setup type in **Figure 7-40** and click **NEXT** to continue.

Step 25: The drivers are installed. See **Figure 7-41**.

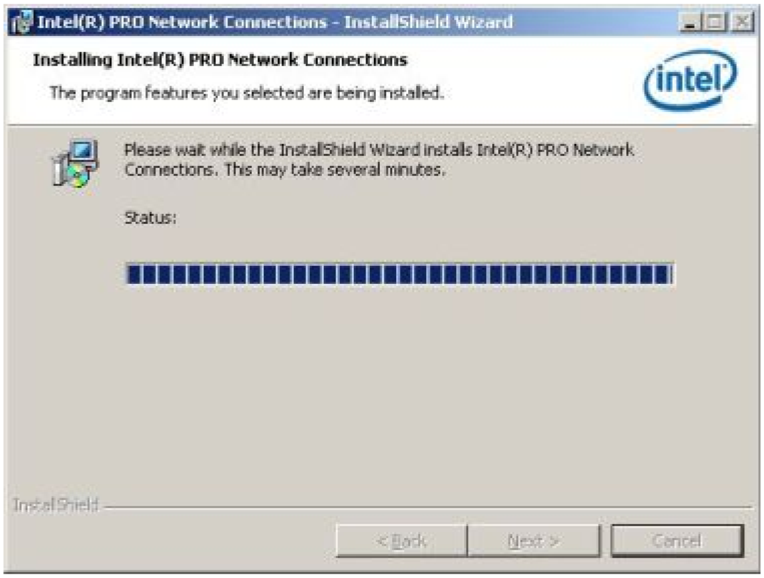


Figure 7-41: Intel® 82573 Driver Installation Progress

Step 26: When the driver is installed. Click **FINISH** in the termination screen.

7.7 Realtek HD Audio Driver (ALC883) Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

NOTE:

This driver only needs to be installed if an external audio kit with a RealTek ALC883 codec is installed.

7.7.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Enable the High Definition Audio controller.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.7.2 Driver Installation

To install the audio driver please follow the steps below.

Step 1: Select **AUDIO** from the list in **Figure 7-2**.

Step 2: A new window opens (Figure 7-42).

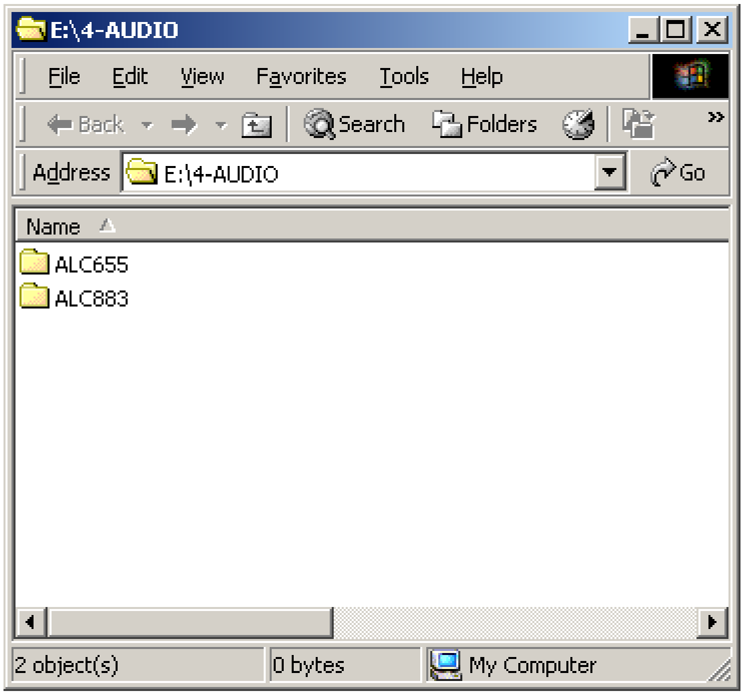


Figure 7-42: Select the Audio CODEC

Step 3: Double-click the ALC883 folder.

Step 4: Double-click the appropriate operating system folder (Figure 7-43).

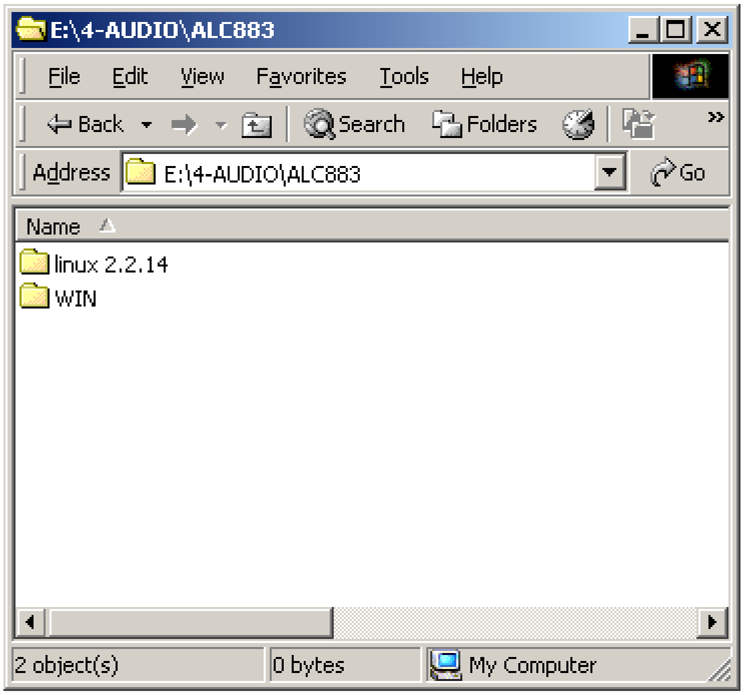


Figure 7-43: Select the OS

Step 5: Double-click the appropriate operating system version folder (Figure 7-44).

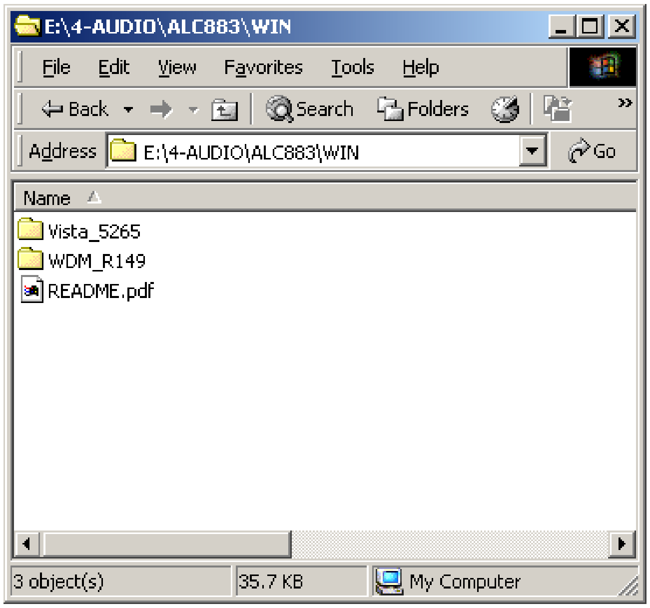


Figure 7-44: Select the OS Version

Step 6: Double-click the **Setup.exe** program icon in Figure 7-45.

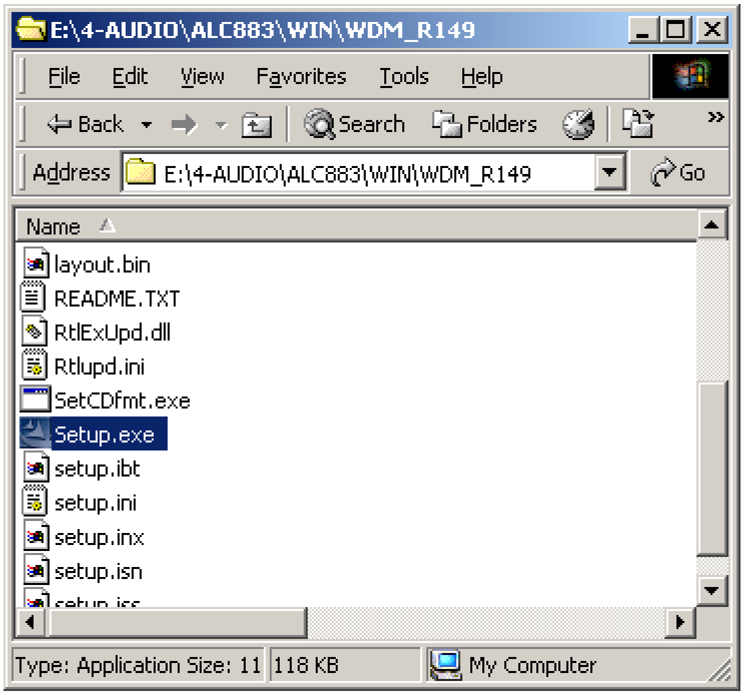


Figure 7-45: Locate the Setup Program Icon

Step 7: The **InstallShield Wizard** starts (Figure 7-46).



Figure 7-46: The InstallShield Wizard Starts

Step 8: The **InstallShield Wizard** is prepared to guide the user through the rest of the process (Figure 7-47).

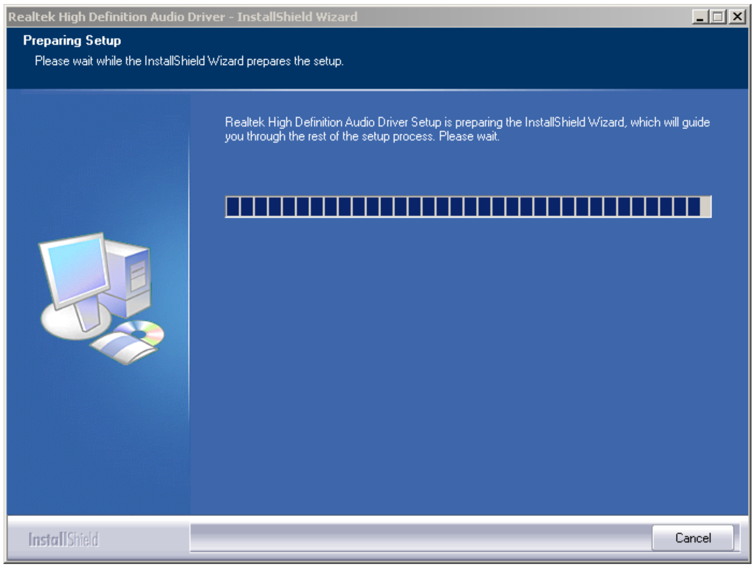


Figure 7-47: Preparing Setup Screen

Step 9: Once initialized, the **InstallShield Wizard** welcome screen appears (Figure 7-48).

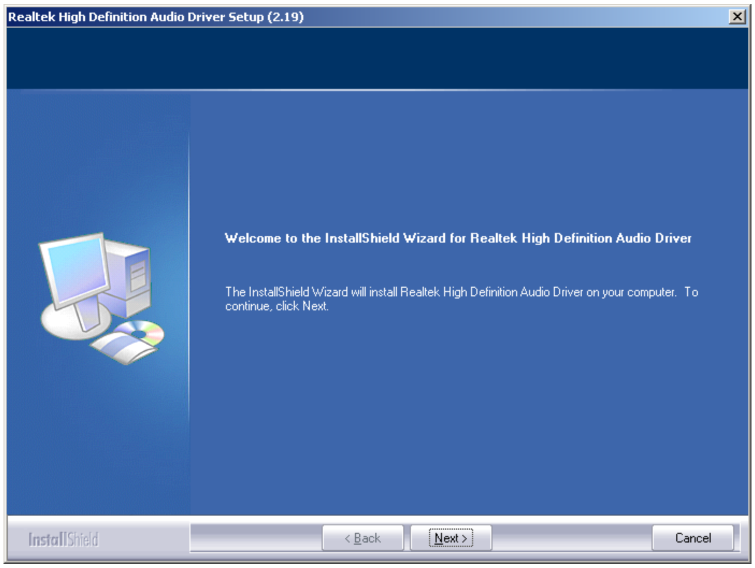


Figure 7-48: InstallShield Wizard Welcome Screen

Step 10: Click **NEXT** to continue the installation.

Step 11: InstallShield starts to install the new software as shown in Figure 7-49.

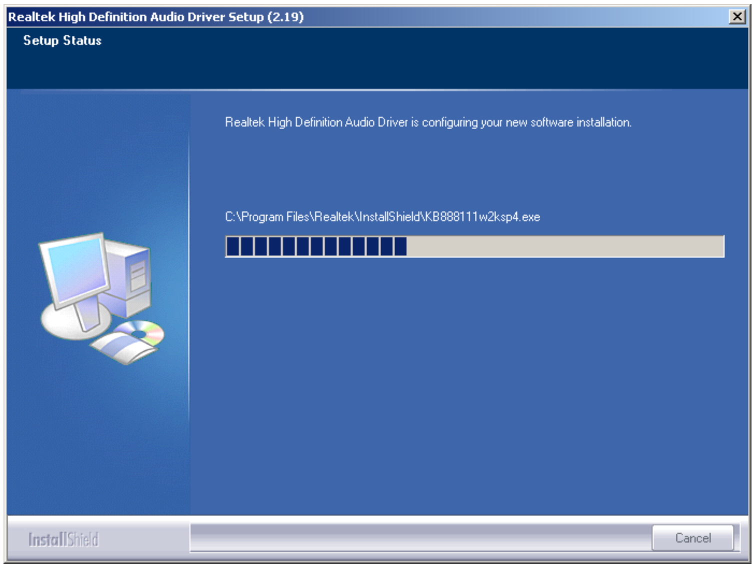


Figure 7-49: Audio Driver Software Configuration

Step 12: The Installation Wizard updates the system as shown in Figure 7-50.

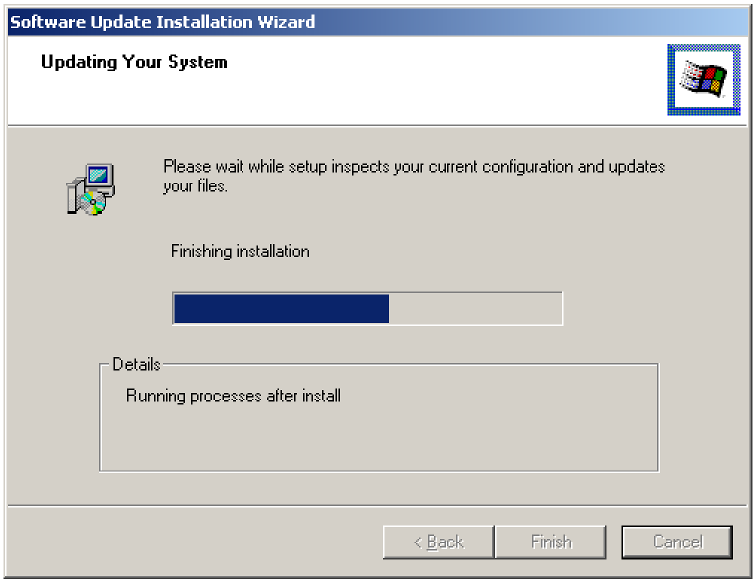


Figure 7-50: Installation Wizard Updates the System

Step 13: After the driver installation process is complete, a confirmation screen appears (Figure 7-51).

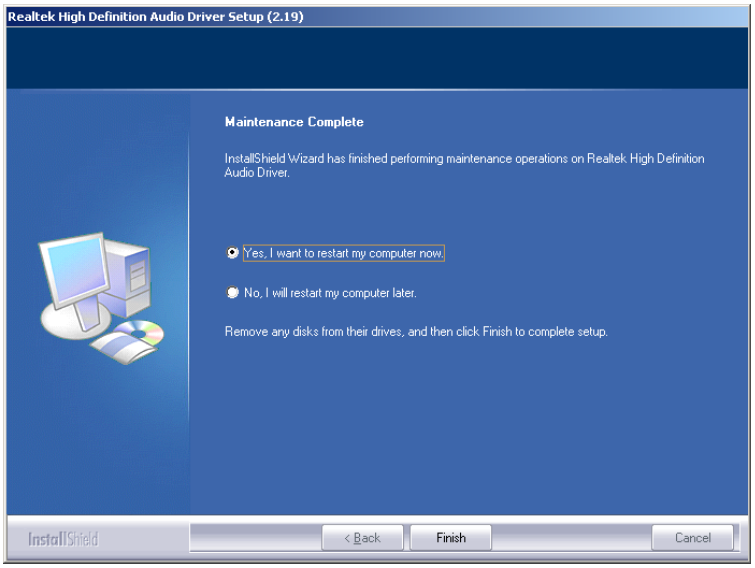


Figure 7-51: Restart the Computer

Step 14: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.8 Intel® Matrix Storage Manager Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

Step 1: Select **SATA** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-52**).

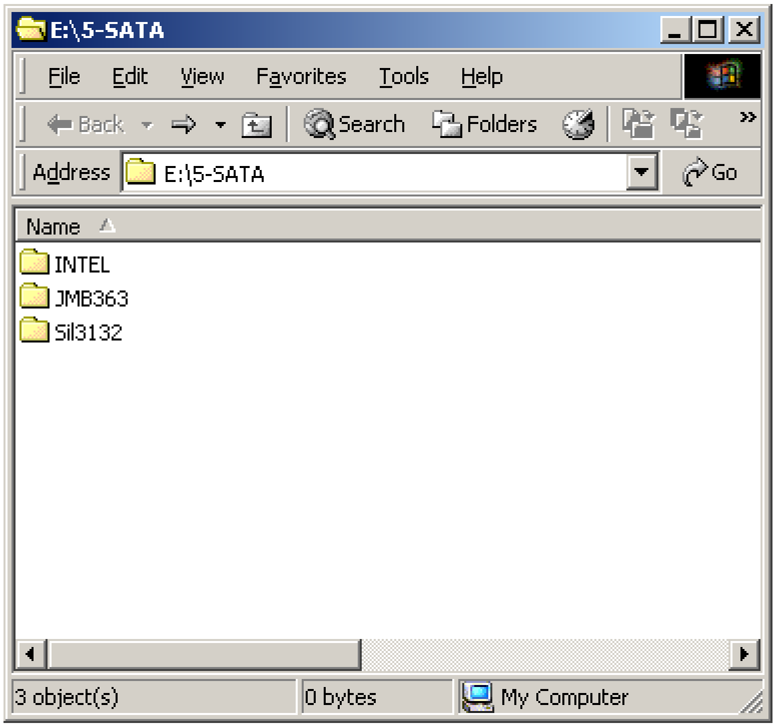


Figure 7-52: SATA RAID Driver Installation Program

Step 3: Double-click the **INTEL®** folder.

Step 4: Double-click the **iata62_cd.exe** program icon in **Figure 7-53**.

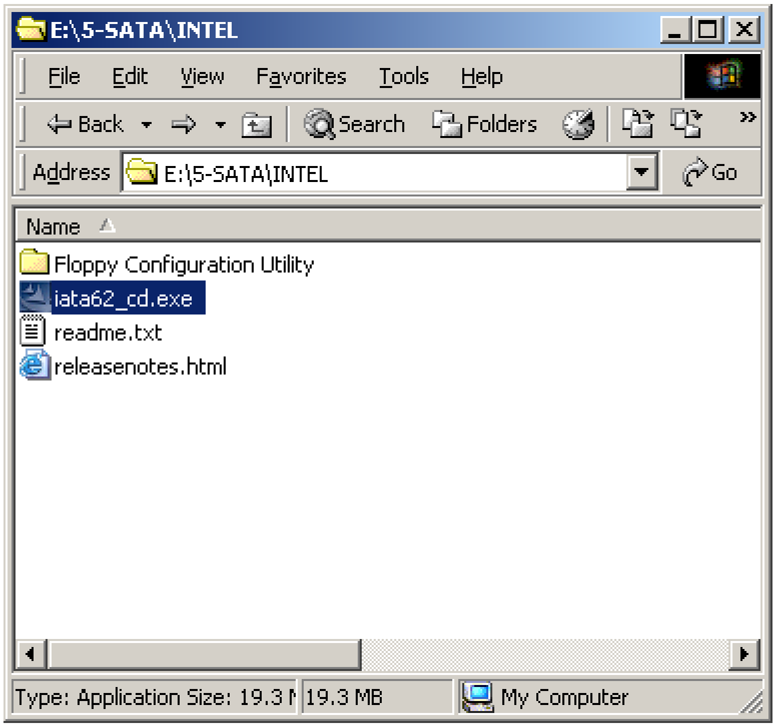


Figure 7-53: SATA RAID Setup Program Icon

Step 5: Figure 7-54 shows the **InstallShield Wizard** preparing to guide the user through the rest of the process.

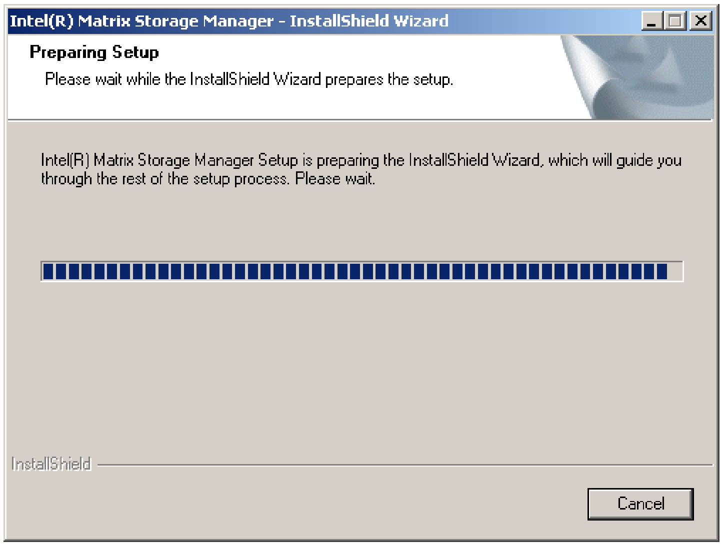


Figure 7-54: InstallShield Wizard Setup Screen

Step 6: Figure 7-55 shows the **Matrix Storage Manager** software configuring the installation process.

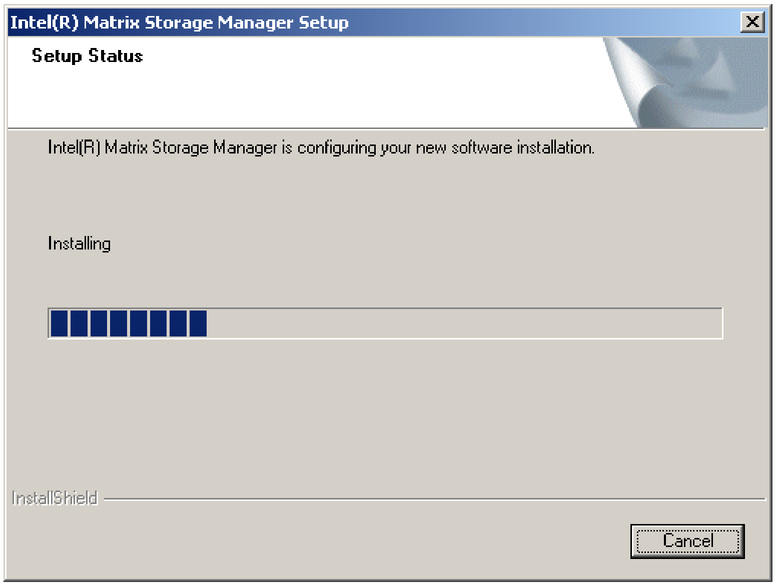


Figure 7-55: Matrix Storage Manager Setup Screen

Step 7: Figure 7-56 shows the **Matrix Storage Manager** welcome screen.

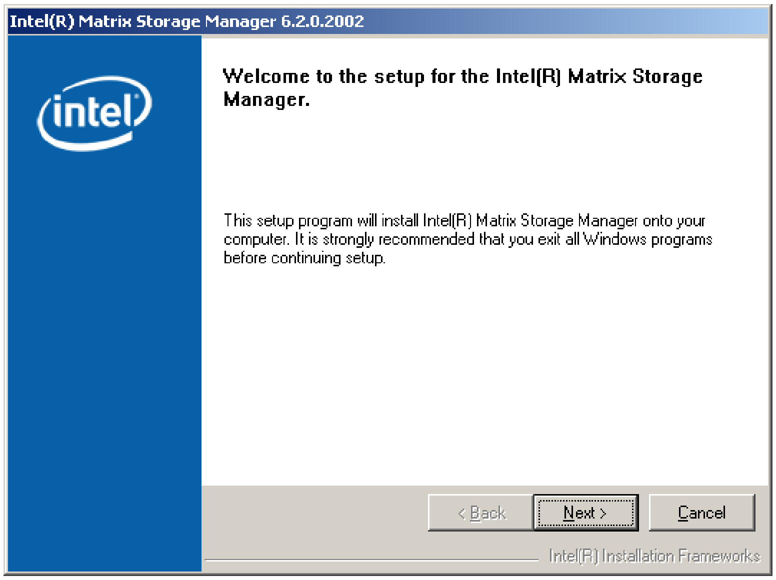


Figure 7-56: Matrix Storage Manager Welcome Screen

Step 8: Click **NEXT** and a warning appears (Figure 7-57). Read the warning carefully and

decide whether or not to continue the installation process.

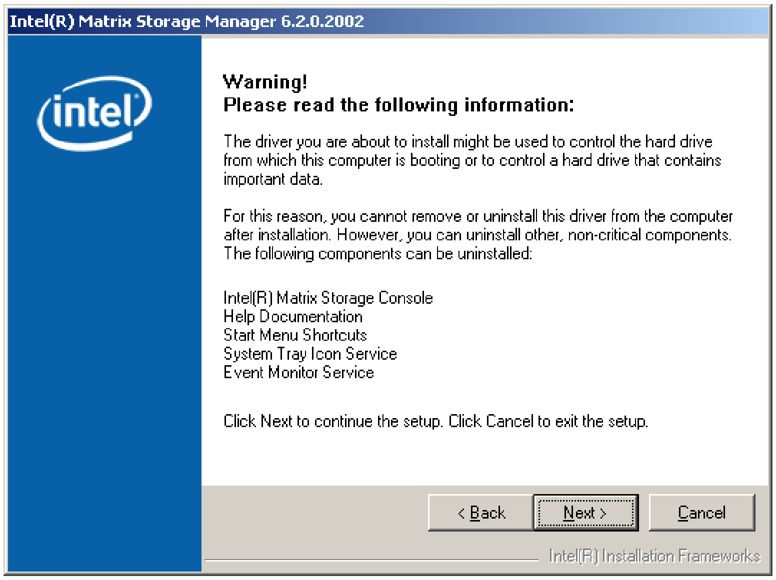


Figure 7-57: Matrix Storage Manager Warning Screen

Step 9: Click **NEXT** and a license agreement appears (Figure 7-58).

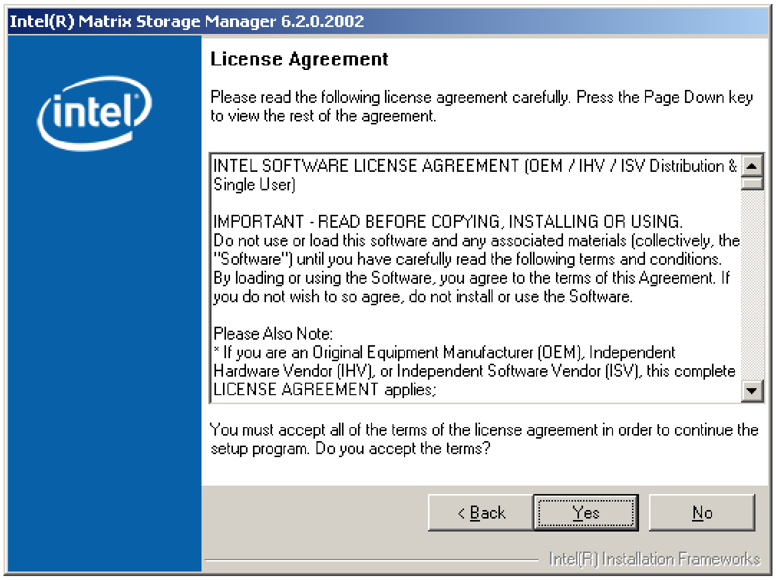


Figure 7-58: Matrix Storage Manager License Agreement

Step 10: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the Readme information file shown in Figure 7-59 appears.

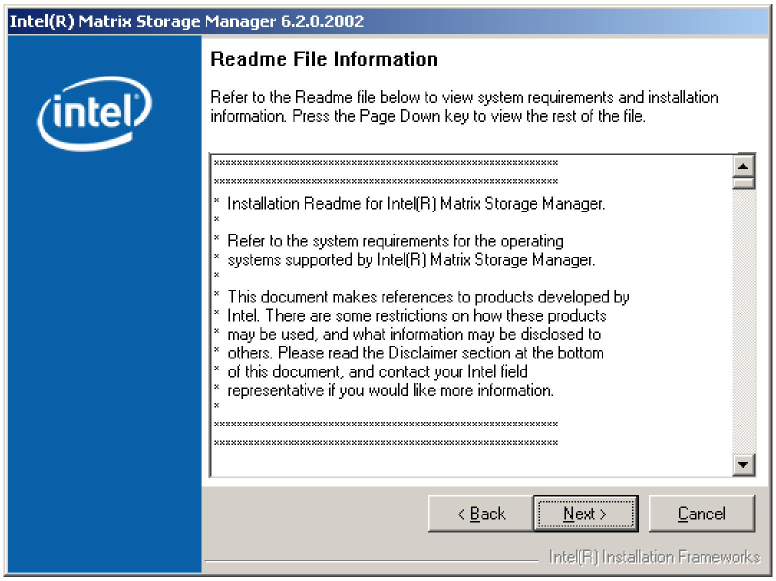


Figure 7-59: Matrix Storage Manager Readme File

Step 11: Read the Readme file information and click **NEXT**.

Step 12: After the driver installation process is complete, a confirmation screen appears (Figure 7-60).

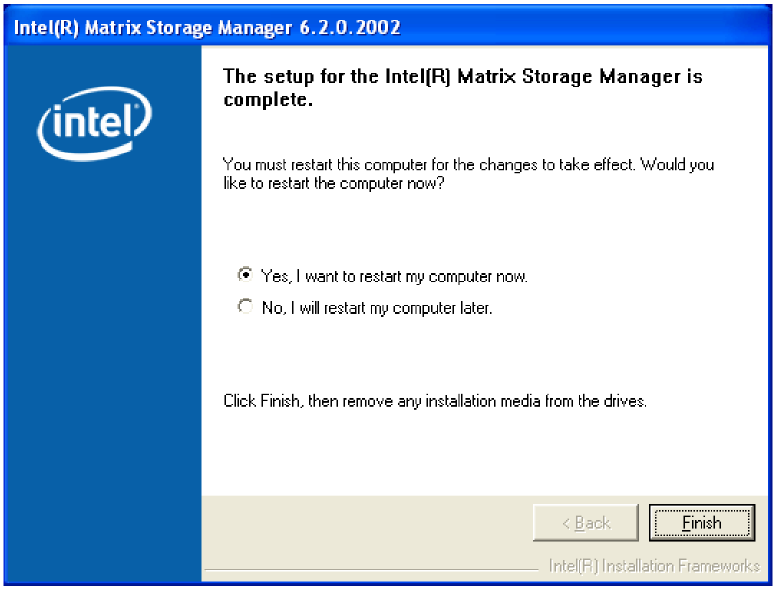


Figure 7-60: Matrix Storage Manager Setup Complete

Step 13: The confirmation screen offers the option of restarting the computer now or later.

For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.9 Intel® Active Management Technology Driver Installation

To install the Intel® Active Management Technology (IAMT) driver, please follow the steps below:

Step 1: Select **iAMT and Utilities** from the list in **Figure 7-2**.

Step 2: The screen in **Figure 7-61** appears.

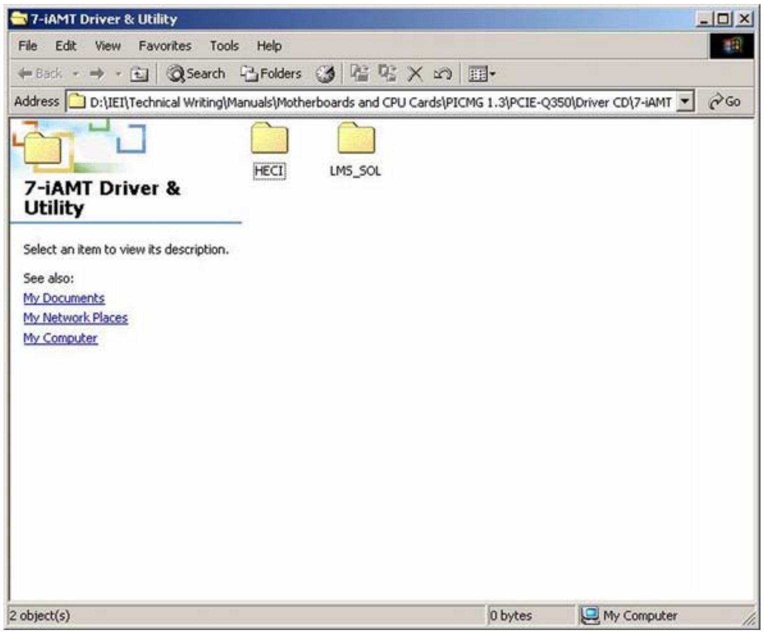


Figure 7-61: IAMT Driver Directory

Step 3: Click on the LMS_SOL directory icon. The window in **Figure 7-62** appears.

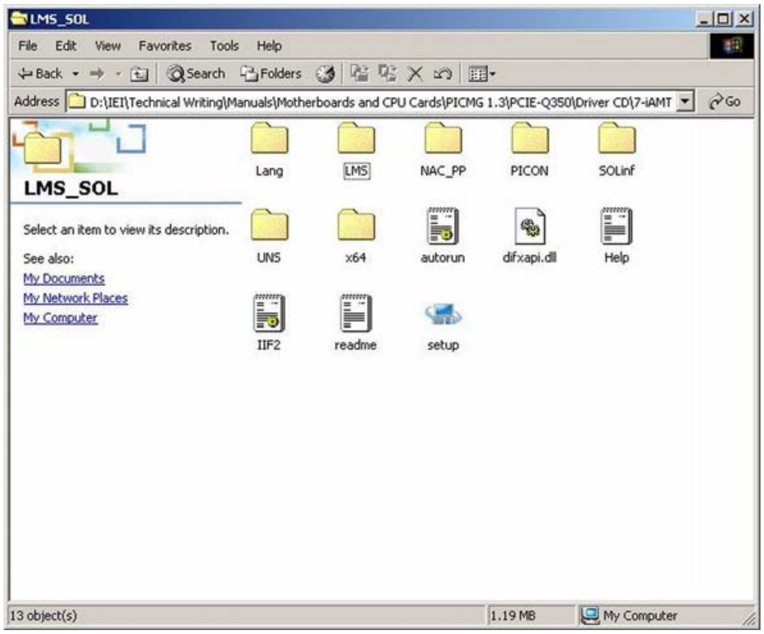


Figure 7-62: IAMT Driver Installation Icon

Step 4: Double click the setup icon in **Figure 7-62**.

Step 5: The window in **Figure 7-63** appears.



Figure 7-63: IAMT Welcome Screen

Step 6: Click **NEXT** to continue. The **License Agreement** in **Figure 7-64** appears.



Figure 7-64: IAMT License Agreement

Step 7: Agree to the terms and conditions in the license agreement by clicking **YES**.

Step 8: The **IAMT Readme** file in **Figure 7-65** appears



Figure 7-65: IAMT Readme File

Step 9: Click **NEXT** to continue.

Step 10: Setup operations are performed. See **Figure 7-66**.

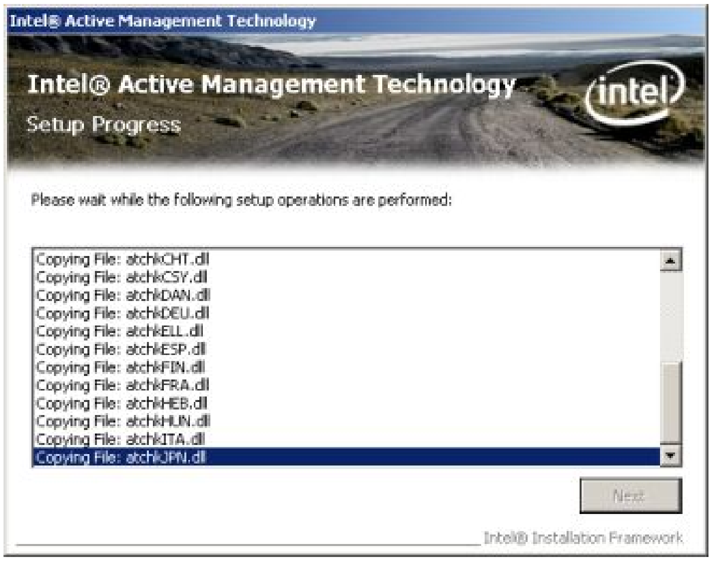


Figure 7-66: IAMT Setup Operations

Step 11: When the Setup Operations in **Figure 7-66** are complete, the window in **Figure 7-67** appears.



Figure 7-67: Completed Installation

Step 12: Click **FINISH** to complete the IAMT installation.

Appendix

A

BIOS Options

Appendix

B

DIO Interface

B.1 DIO Interface Introduction

The DIO connector on the PCIE-Q350 is interfaced to GIO ports on the iTE Super I/O chipset. The DIO has both 8-bit digital inputs and 8-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the iTE Super I/O chipset.

B.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Input 0	19 (GP30)	General purpose I/O port 3 bit 0
2	Output 0	27 (GP20)	General purpose I/O port 2 bit 0
3	Input 1	18 (GP31)	General purpose I/O port 3 bit 1
4	Output 1	26 (GP21)	General purpose I/O port 2 bit 1
5	Input 2	17 (GP32)	General purpose I/O port 3 bit 2
6	Output 2	25 (GP22)	General purpose I/O port 2 bit 2
7	Input 3	16 (GP33)	General purpose I/O port 3 bit 3
8	Output 3	24 (GP23)	General purpose I/O port 2 bit 3
9	Input 4	14 (GP34)	General purpose I/O port 3 bit 4
10	Output 4	23 (GP24)	General purpose I/O port 2 bit 4
11	Input 5	13 (GP35)	General purpose I/O port 3 bit 5
12	Output 5	22 (GP25)	General purpose I/O port 2 bit 5
13	Input 6	12 (GP36)	General purpose I/O port 3 bit 6
14	Output 6	21 (GP26)	General purpose I/O port 2 bit 6

15	**Input 7**	**11 (GP37)**	**General purpose I/O port 3 bit 7**
16	**Output 7**	**20 (GP27)**	**General purpose I/O port 2 bit 7**
17	**GND**	**N/A**	**N/A**
18	**+5V**	**N/A**	**N/A**

B.3 Assembly Language Samples

B.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

```
MOV     AX, 6F08H     Sets the digital port as input
INT     15H           Initiates the INT 15H BIOS call
```

B.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

```
MOV     AX, 6F09H     Sets the digital port as output
MOV     BL, 09H
INT     15H           Initiates the INT 15H BIOS call
```

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Appendix

C

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table C-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H
;
; EXIT ;
```

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Appendix

D

Address Mapping

D.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel® Graphics Controller
3C0-3DF	Intel® Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table D-1: IO Address Map

D.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table D-3: IRQ Mapping Table

D.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table D-4: IRQ Mapping Table

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Appendix

E

Intel® Matrix Storage Manager

E.1 Introduction

The Intel® ICH9DO chipset can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

E.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

E.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives
- Supported Operating Systems include: Windows XP, Windows Server 2003 and Windows Vista

E.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

Step 1: **Connect SATA drives to the system**. Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration. If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: **Enable SATA drives in BIOS**. Start the computer and access the **BIOS** setup program. Enable **SATA** support for all IDE devices. Refer to the applicable BIOS configuration section in this user manual.

Step 3: **Save and Exit BIOS**. After the **SATA** support option is enabled, save and exit the **BIOS**.

Step 4: **Reboot the system**. Reboot the system after saving and exiting the **BIOS**.

Step 5: **Press Ctrl+I**. During the system boot process, press **Ctrl+I** when prompted to enter the RAID configuration software.

Step 6: **Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

Step 7: **Install the OS**. After the RAID array has been configured, install the OS. To do this, please refer to the documentation that came with the OS.

E.4 RAID Configuration

E.4.1 Creating a RAID Volume

WARNING!

All data previously stored on the member drives of a RAID configuration are destroyed during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** "**Create RAID Volume**." Use the arrow keys to highlight **Create RAID Volume** and press **ENTER**. See **Figure E-1**.

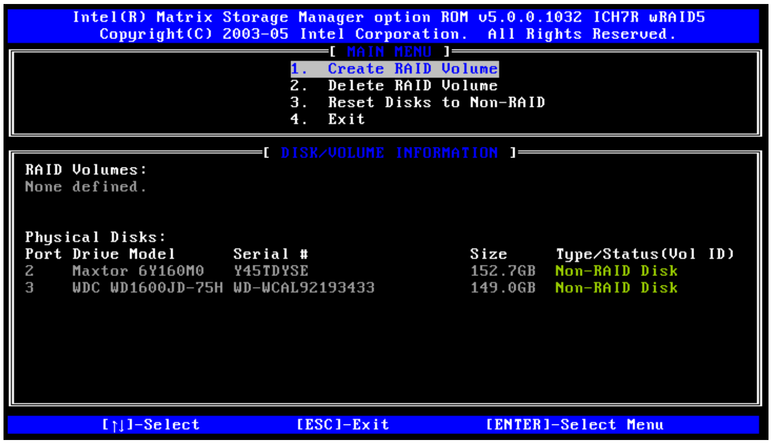


Figure E-1: Matrix Storage Manager Main Menu

Step 2: **Name the RAID volume**. Enter a name for the RAID volume, or press **ENTER** to accept the default volume name. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array. See **Figure E-2**.

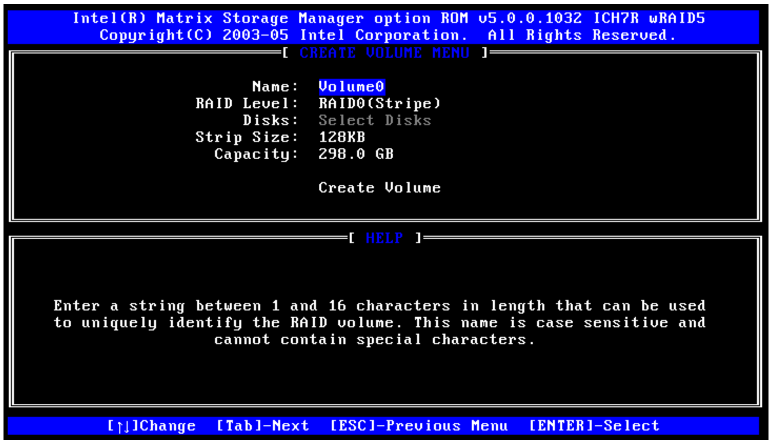


Figure E-2: Create RAID Volume Name

Step 3: **Choose the RAID level**. Select a RAID level from the list. RAID levels include RAID 0, 1, 5 and 10. See **Figure E-3**.

NOTE:

RAID 0 and RAID1 levels require a minimum of two hard drives.

RAID 10 level requires a minimum of four hard drives.

RAID5 level requires a minimum of three hard drives.

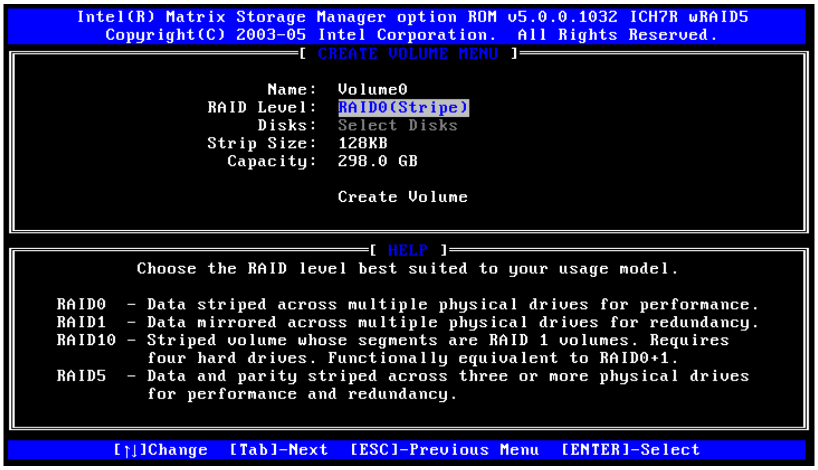


Figure E-3: Choose the Raid Level

Step 4: **Select the Stripe Size**. Select a stripe size from the list. See **Figure E-4**.

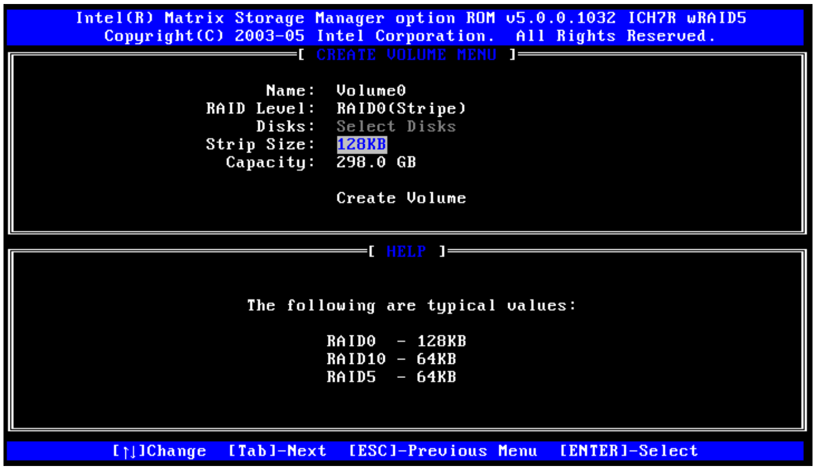


Figure E-4: Select the Stripe Size

Step 5: **Enter the Volume Capacity**. Enter the volume capacity, or press **ENTER** to accept the default capacity. See **Figure E-5**.

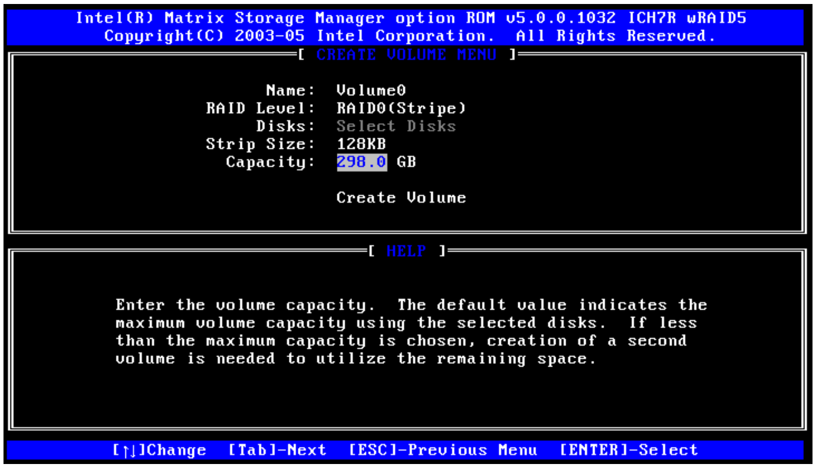


Figure E-5: Enter the Volume Capacity

Step 6: **Create the RAID Volume**. Press **ENTER** to create the RAID volume as specified. See **Figure E-6**.

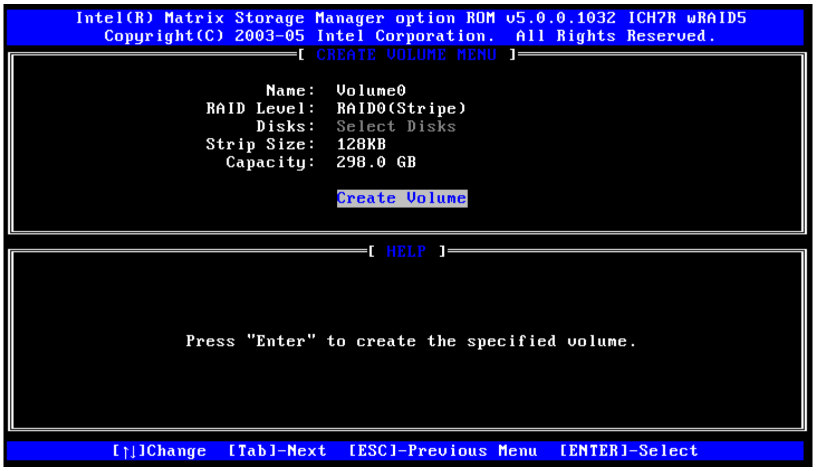


Figure E-6: Create the RAID Volume

Step 7: **Create RAID Volume Verification**. After reading the warning, press **Y** to create the RAID volume as specified, or **N** to return to the **Create RAID Volume** menu. See **Figure E-7**.

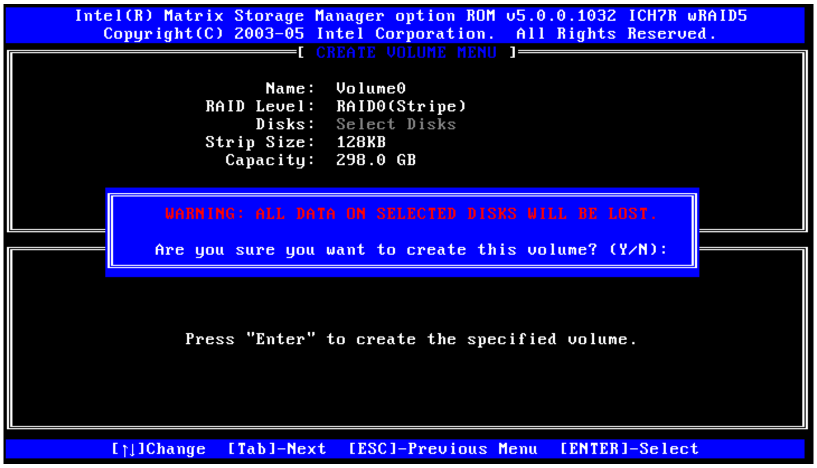


Figure E-7: Create RAID Volume Verification

E.4.2 Deleting a RAID Volume

WARNING!

All data stored on the member drives of a RAID volume are destroyed during the RAID deletion process. Make sure any data to be saved has been moved or backed up before deleting a RAID volume.

Step 1: **Select** "**Delete RAID Volume**." Use the arrow keys to highlight **Delete RAID Volume** and press **ENTER**. See **Figure E-8**.

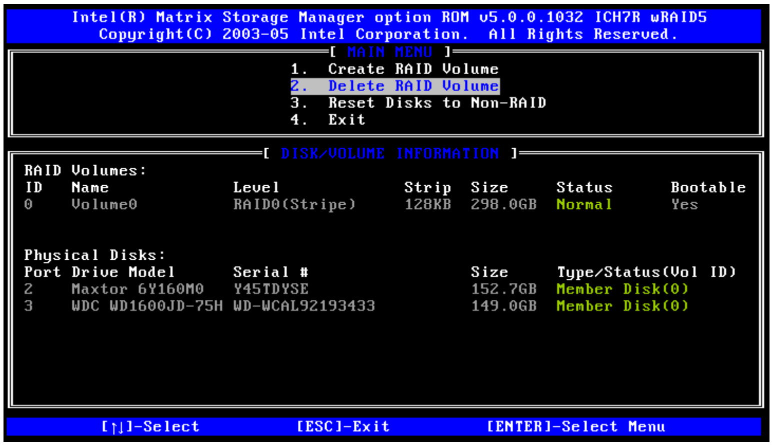


Figure E-8: Delete RAID Volume Menu

Step 2: **Select RAID Volume to be Deleted**. Use the arrow keys to highlight the RAID volume to be deleted and press ENTER. See **Figure E-9**.

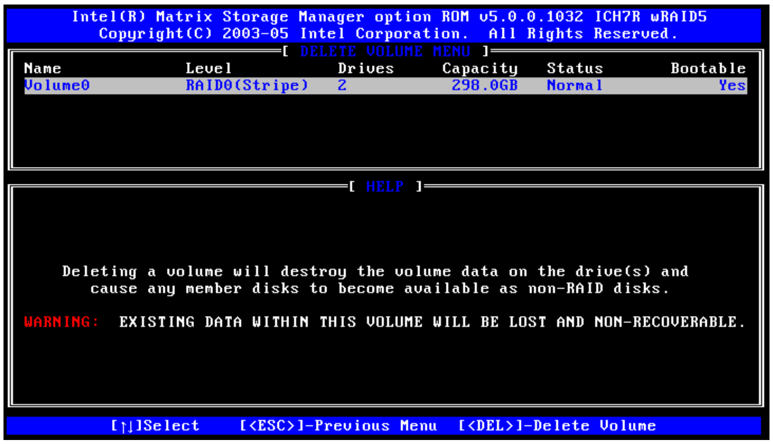


Figure E-9: Select RAID Volume to be Deleted

Step 3: **Delete Volume Verification**. After reading the warning, press **Y** to delete the specified RAID volume, or **N** to return to the **Delete Volume** menu. See **Figure E-10**.

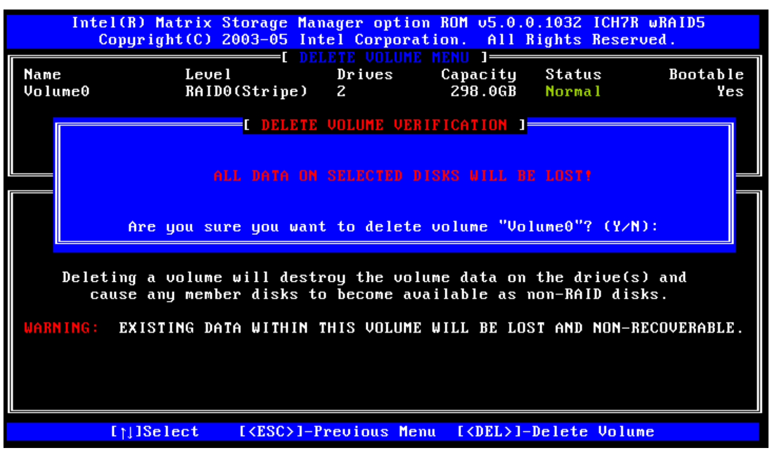


Figure E-10: Delete Volume Verification

Step 4: **Non-RAID Disks**. After deleting the RAID volume, the disks belonging to the volume will be shown as non-RAID disks. See **Figure E-11**.

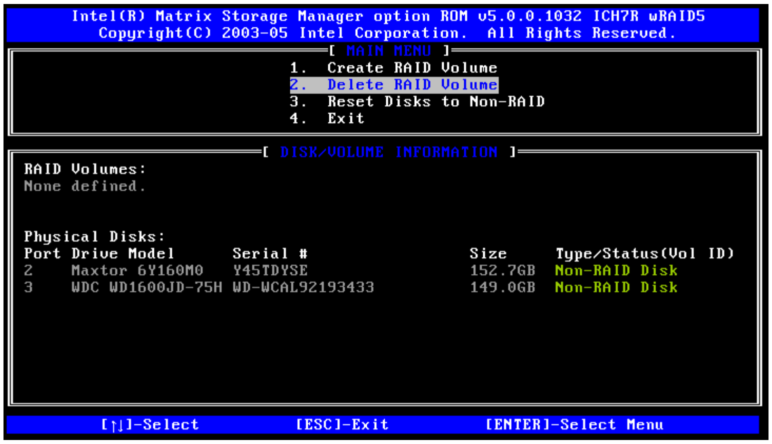


Figure E-11: Non-RAID Disks

E.4.3 Resetting a Disk to Non-RAID

WARNING!

All data stored on the disk drive of a RAID volume is destroyed when resetting it to non-RAID. Make sure any data to be saved has been moved or backed up before resetting a disk to non-RAID.

Step 1: **Select** "**Reset Disk to Non-RAID**." Use the arrow keys to highlight **Reset Disk to Non-RAID** and press **ENTER**. See **Figure E-12**.

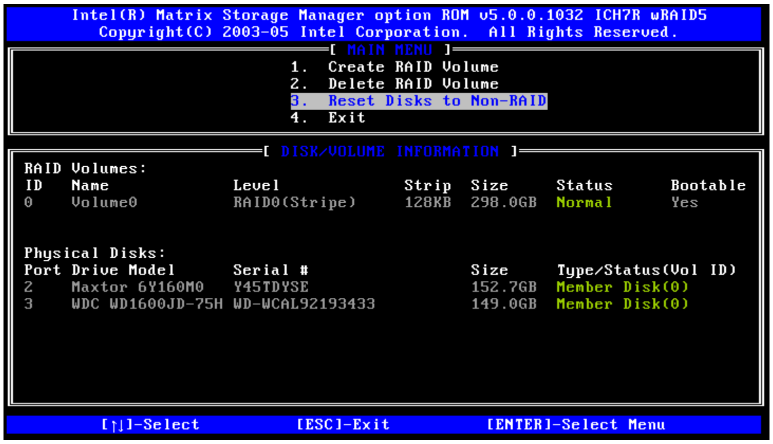


Figure E-12: Reset Disk to Non-RAID Menu

Step 2: **Select Disks to Reset**. Use the arrow keys to scroll through the disk drives and press **SPACE** to select which drives are to be reset as non-RAID. After all the disks to be reset have been chosen, press **ENTER**. See **Figure E-13**.

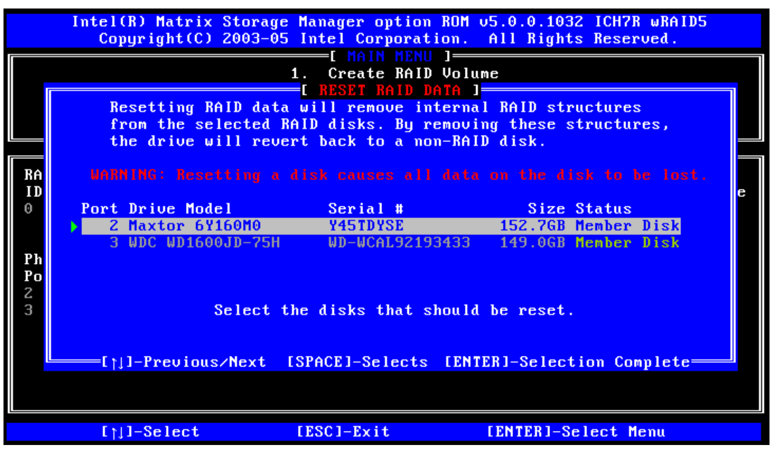


Figure E-13: Select Disk to Reset

Step 3: **Reset Disk Verification**. After reading the warning, press **Y** to reset the selected disks as non-RAID, or **N** to return to the **Reset RAID Data** menu. See **Figure E-14**.

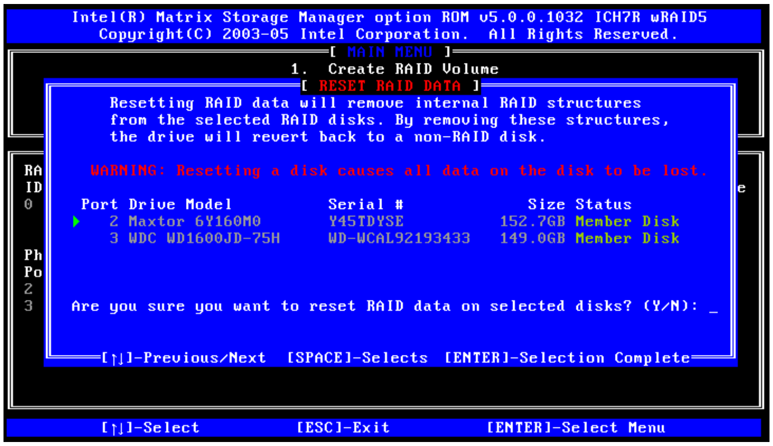


Figure E-14: Reset Disk Verification

Step 4: **Disk Drive and RAID Volume Status**. After the disk drives have been reset, the **Matrix Storage Manager Main** menu is shown indicating the status of the RAID volumes and disk drives. See **Figure E-15**.

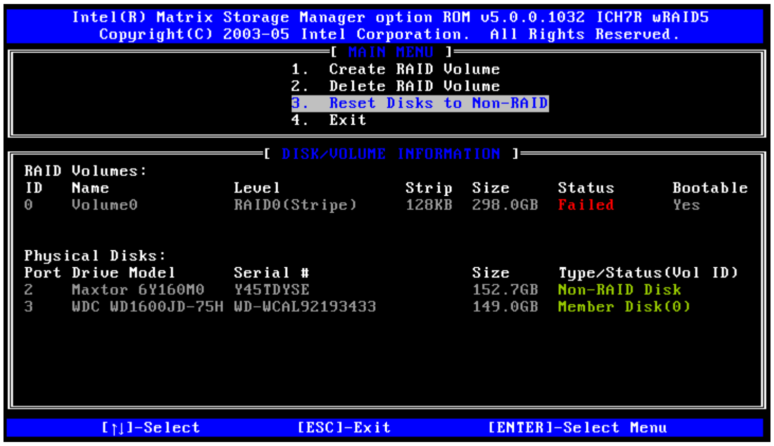


Figure E-15: Disk Drive and RAID Volume Status

E.4.4 Exiting the Matrix Storage Manager

Step 1: **Select** "**Exit**." Use the arrow keys to highlight **Exit** and press **ENTER.** See **Figure E-16**.

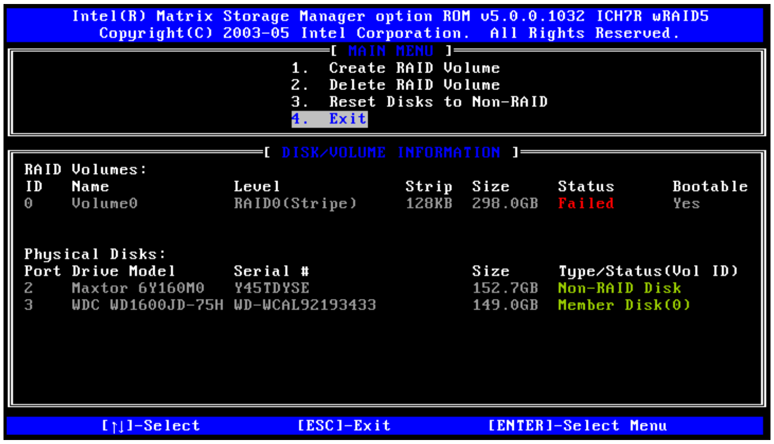


Figure E-16: Exit Menu

Step 2: **Exit Verification**. Press **Y** to exit the **Matrix Storage Manager**, or **N** to return to the **Main** menu. See **Figure E-17**.

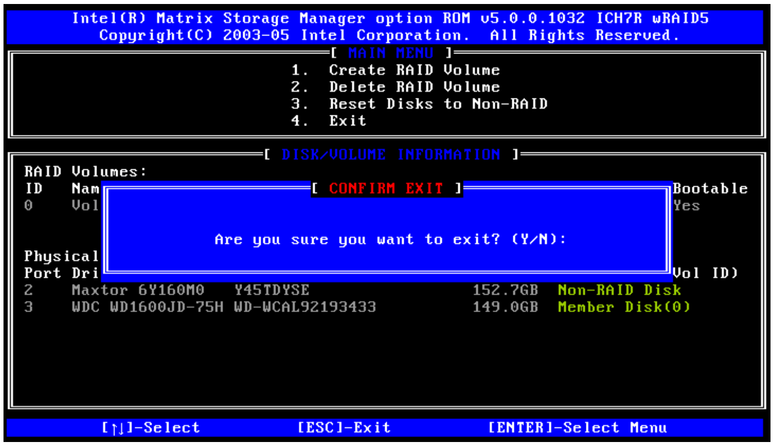


Figure E-17: Exit Verification

Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有”环境友好使用期限”的标签，此期限是估算这些物质”不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						

Appendix

G

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the PCIE-Q350

G.1 Compatible Operating Systems

The following operating systems have been successfully run on the PCIE-Q350.

- Microsoft Windows XP with Service Pack 2 (32-bit)
- Microsoft Windows XP with Service Pack 2 (64-bit)
- Microsoft Windows 2000 with Service Pack 4
- Microsoft Windows Server (32-bit)
- Microsoft Windows Server (64-bit)
- Microsoft Windows XP Embedded POS
- Microsoft Windows Vista Business (32-bit)
- Microsoft Windows Vista Business (64-bit)
- Mandriva Linux 2006
- Mandriva Linux 2007
- Ubuntu 7.04
- Red Hat 9.0
- SuSE 10
- Fedora Core 7

G.2 Compatible Processors

The following LGA775 processors have been successfully tested on the PCIE-Q350.

CPU	Model Number	Frequency	Bus Speed
Intel® Core™2 Duo	E6700	2.66 GHz	1066 MHz
Intel® Core™2 Quad	Q6600	2.40 GHz	1066 MHz
Intel® Core™2 Duo	E6600	2.40 GHz	1066 MHz
Intel® Core™2 Duo	E6400	2.13 GHz	1066 MHz
Intel® Core™2 Duo	E6300	1.86 GHz	1066 MHz
Intel® Core™2 Duo	E6850	3.00 GHz	1333 MHz
Intel® Core™2 Duo	E6750	2.66 GHz	1333 MHz
Intel® Core™2 Duo	E6550	2.33 GHz	1333 MHz
Intel® Core™2 Duo	E4400	2.00 GHz	800 MHz
Intel® Core™2 Duo	E4300	1.80 GHz	800 MHz
Intel® Pentium® D	820	2.80 GHz	800 MHz
Intel® Pentium® 4	651	3.40 GHz	800 MHz
Intel® Pentium® 4	661	3.60 GHz	800 MHz
Intel® Pentium® 4	670	3.8 GHz	800 MHz
Intel® Pentium® 4	Extreme Edition	3.73 GHz	1066 MHz

G.3 Compatible Memory Modules

NOTE:

The memory modules listed below have been tested on the PCIE-Q350 other memory modules that comply with the specifications may also work on the PCIE-Q350 but have not been tested.

The following memory modules have been successfully tested on the PCIE-Q350

Manufacturer	Model No.	Capacity	Speed
Kingston	KHX5400D2K2/2G	1 GB	667 MHz
Kingston	KHX5400D2K2/1G	512 MB	667 MHz
Kingston	KVR667D2N5/2G	2 GB	667 MHz
Transcend	TS128MLQ64V8J	1 GB	800 MHz
Transcend	TS64MLQ64V6J	512 MB	667 MHz

Transcend	TS64MLQ64V6J	512 MB	667 MHz
Transcend	TS32MLQ64V6M	256 MB	667 MHz
CORSAIR	VS51MB667D2	512 MB	667 MHz
CORSAIR	VS1GB667D2	1 GB	667 MHz
CORSAIR	VS2GB667D2	2 GB	667 MHz
CORSAIR	CM2X1024-6400C4 G	1 GB	800 MHz

G.4 Compatible CD ROM Drives

NOTE:

The CD ROM drives listed below have been tested on the PCIE-Q350 other CD ROM drives s that comply with the specifications may also work on the PCIE-Q350 but have not been tested.

The following CD ROM drives have been successfully tested on the PCIE-Q350.

Manufacturer	Model No.	Speed	Interface	Description
ASUS	CRW-5232A-U/QT	52X	CD-RW	USB 2.0
ASUS	DRW-1814BLT	18x	DVD±RW	SATA
Liteon	LH-2B1S	BD 2x / DVD 12x	BD/DVD±RW	SATA

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